

141.71(b)(4)	The public water system must not have been identified as a source of a waterborne disease outbreak, or if it has been so identified, the system must have been modified sufficiently to prevent another such occurrence, as determined by the State.		N/A
141.71(b)(5)	The public water system must comply with the maximum contaminant level (MCL) for total coliforms in §141.63 at least 11 months of the 12 previous months that the system served water to the public, on an ongoing basis, unless the State determines that failure to meet this requirement was not caused by a deficiency in treatment of the source water.		N/A
141.71(b)(6)	The public water system must comply with the requirements for trihalomethanes in §§141.12 and 141.30 until December 31, 2001. After December 31, 2001, the system must comply with the requirements for total trihalomethanes, haloacetic acids (five), bromate, chlorite, chlorine, chloramines, and chlorine dioxide in subpart L of this part.		N/A
141.71(c)	Treatment technique violations.		N/A
141.71(c)(1)	A system that (i) fails to meet any one of the criteria in paragraphs (a) and (b) of this section and/or which the State has determined that filtration is required, in writing pursuant to §141.2(b)(7)(C)(iii), and (ii) fails to install filtration by the date specified in the introductory paragraph of this section is in violation of a treatment technique requirement.		N/A
141.71(c)(2)	A system that has not installed filtration is in violation of a treatment technique requirement if:		N/A
141.71(c)(2)(i)	The turbidity level (measured as specified in §141.74(a)(1) and (b)(2)) in a representative sample of the source water immediately prior to the first or only point of disinfection application exceeds 5 NTU; or		N/A

141.71(c)(2)(ii)	The system is identified as a source of a waterborne disease outbreak.		K1A (C10)LS see com-mat C9
141.72	<p>A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to §1412 (b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground</p>	<p>Less stringent see pg 18</p> <p>not same as 8.1.2.1 & 1 1/2</p> <p>When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this subsection, 8.1.2, no later than 18 months after receiving written notification from the Department of the source's reclassification.</p>	8.1.2(d)

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141.72	<p>A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to §141.2 (b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §141.2(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground</p>	<p>For all surface water systems, the supplier must comply with the disinfection treatment technique requirements specified in this section, 8.3.</p> <p><i>Paragraph is 8.1.2 and not 8.3 inclusive</i></p>	<p>C10LS see comment 8</p> <p>8.3.1(a)</p>
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141.72	<p>A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to §1412 (b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground</p>	<p>When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with all of the following:</p>	<p>C10LS</p> <p>8.3.1(b)</p>
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141.72	<p>A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to §1412 (b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground</p>	<p>Either Department-determined interim disinfection requirements or disinfection treatment technique requirements specified in 8.3.2, no later than 60 days after written notification from the Department of the decision to change the source's classification; and</p>	<p>C10 LS 8.3.1(b)(1)</p>
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141.72	<p>A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to §1412 (b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground</p>	<p>All requirements specified in this section, 8.3, no later 18 months after written notification from the Department of the decision to change the source's classification or no later than when the filtration is installed, whichever is sooner.</p>	<p>C 10 LS 8.3.1(b)(2)</p>
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141.72	<p>A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to §1412 (b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground</p>	Treatment Technique Violations for Disinfection	<p>8.3.4</p>
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↓ Fed language continues to discuss violations. Cross with 141.72

C10
LS

141.72	<p>A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to §1412 (b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground</p>	<p><i>Less stringent due to 8.3.4 a not including treatment technique for systems not meeting criteria after the 18 months</i></p> <p>The following constitute disinfection treatment technique violations:</p>	<p><i>C10</i> <i>LS</i></p> <p>8.3.4(a)</p>
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	A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, unless the State determines that filtration is required in writing pursuant to §1412 (b)(7)(C)(iii). A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph (a) of this section beginning December 30, 1991, or 18 months after the State determines that the ground water source is under the influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii). If the State has determined that filtration is required, the system must comply with any interim disinfection requirements the State deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in paragraph (b) of this section beginning June 29, 1993, or beginning when filtration is installed, whichever is later. A system that uses a ground		C10 LS
141.72	Disinfection requirements for public water systems that do not provide filtration. Each public water system that does not provide filtration treatment must provide disinfection treatment as follows:	Any time the supplier fails to comply with the treatment technique requirements specified in 8.3.2(a)(1).	8.3.4(a)(3)
141.72(a)			N/A

	<p>The disinfection treatment must be sufficient to ensure at least 99.9 percent (3-log) inactivation of Giardia lamblia cysts and 99.99 percent (4-log) inactivation of viruses, every day the system serves water to the public, except any one day each month. Each day a system serves water to the public, the public water system must calculate the CT value(s) from the system's treatment parameters, using the procedure specified in §141.74(b)(3), and determine whether this value(s) is sufficient to achieve the specified inactivation rates for Giardia lamblia cysts and viruses. If a system uses a disinfectant other than chlorine, the system may demonstrate to the State, through the use of a State-approved protocol for on-site disinfection challenge studies or other information satisfactory to the State, that CT99.9 values other than those specified in tables 2.1 and 3.1 in §141.74(b)(3) or other operational parameters are adequate to demonstrate that the system is achieving minimum inactivation rates required by paragraph (a)(1) of this section.</p>		N/A
141.72(a)(1)			
	<p>The disinfection system must have either (i) redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system, or (ii) automatic shut-off of delivery of water to the distribution system whenever there is less than 0.2 mg/l of residual disinfectant concentration in the water. If the State determines that automatic shut-off would cause unreasonable risk to health or interfere with fire protection, the system must comply with paragraph (a)(2)(i) of this section.</p>		N/A
141.72(a)(2)			

141.72(a)(3)	The residual disinfectant concentration in the water entering the distribution system, measured as specified in §141.74 (a)(2) and (b)(5), cannot be less than 0.2 mg/l for more than 4 hours.		N/A
141.72(a)(4)(i)	<p>system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in §141.74 (a)(2) and (b)(5), cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in §141.74(a)(1), is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.</p> <p>where:</p> <p>a=number of instances where the residual disinfectant concentration is measured;</p> <p>b=number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;</p> <p>c=number of instances where the residual disinfectant</p>		N/A

	if the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (a)(4)(i) of this section do not apply to that system.		N/A
141.72(a)(4)(ii)	Disinfection requirements for public water systems which provide filtration. Each public water system that provides filtration treatment must provide disinfection treatment as follows.	→ NO not in crosswalk to 8.1.2 → NO not in " 76 8.3.1	C11
141.72(b)	The disinfection treatment must be sufficient to ensure that the total treatment processes of that system achieve at least 99.9 percent (3-log) inactivation and/or removal of Giardia lamblia cysts and at least 99.99 percent (4-log) inactivation and/or removal of viruses, as determined by the State.	The disinfection treatment technique requirements are as follows: The supplier must maintain disinfection treatment sufficient to ensure that the total treatment processes, including filtration and disinfection, achieve 99.9 percent (3 log) treatment of Giardia lamblia cysts and 99.99 percent (4-log) treatment of viruses, as determined by the Department.	C12 8.3.2(a)
141.72(b)(1)	The residual disinfectant concentration in the water entering the distribution system, measured as specified in §141.74(a)(2) and (c)(2), cannot be less than 0.2 mg/L for more than 4 hours.	not the same The supplier must maintain a residual disinfectant concentration at each entry point and throughout the distribution system.	C13 8.3.2(a)(1)
141.72(b)(2)	The residual disinfectant concentration in the water entering the distribution system, measured as specified in §141.74(a)(2) and (c)(2), cannot be less than 0.2 mg/L for more than 4 hours.	At each entry point, the residual disinfectant concentration cannot be less than (<) 0.2 mg/L for more than four hours.	C13 8.3.2(a)(2)(i)
141.72(b)(2)	The residual disinfectant concentration in the water entering the distribution system, measured as specified in §141.74(a)(2) and (c)(2), cannot be less than 0.2 mg/L for more than 4 hours.	N/A here The following constitute disinfection treatment technique violations:	C13 8.3.4(a)

141.72(b)(2)	<p>The residual disinfectant concentration in the water entering the distribution system, measured as specified in §141.74 (a)(2) and (c)(2), cannot be less than 0.2 mg/l for more than 4 hours. <i>The residual dis conc. in the distribution</i></p>	<p>At any entry point, the residual disinfectant concentration is less than (<) 0.2 mg/L for more than four hours. <i>not for this paragraph</i></p>	8.3.4(a)(1)
<p><i>CR 008 walk through complete</i></p> <p>141.72(b)(3)(i)</p>	<p>system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in §141.74 (a)(2) and (c)(3), cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in §141.74(a)(1), is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.</p> $V = ((c+d+e)/(a+b)) * 100$ <p>where:</p> <p>a=number of instances where the residual disinfectant concentration is measured;</p> <p>b=number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;</p> <p>c=number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;</p>	<p><i>State uses free chlorine for disinfection. All systems that don't use chloramines uses total for chloramines — OK</i></p> <p><i>not included</i></p> <p><i>not included</i></p> <p>The supplier must measure the residual disinfectant concentration as free chlorine unless the supplier uses a disinfection process that results in a monochloramine residual disinfectant, then the supplier must measure the residual disinfectant concentration as total chlorine.</p>	8.3.3(a)(2)(i)

<p>141.72(b)(3)(i)</p>	<p>system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in §141.74 (a)(2) and (c)(3), cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in §141.74(a)(1), is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.</p> $V = ((c+d+e)/(a+b)) * 100$ <p>where:</p> <p>a=number of instances where the residual disinfectant concentration is measured;</p> <p>b=number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;</p> <p>c=number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;</p>	<p><i>APPLICABLE FOR 141.72</i></p> <p>The following constitute disinfection treatment technique violations:</p>	<p>C14</p> <p>8.3.4(a)</p>
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<p>141.72(b)(3)(i)</p>	<p>system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in §141.74 (a)(2) and (c)(3), cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in §141.74(a)(1), is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.</p> $V = ((c+d+e)/(a+b)) * 100$ <p>where:</p> <p>a=number of instances where the residual disinfectant concentration is measured;</p> <p>b=number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;</p> <p>c=number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;</p>	<p>In the distribution system, the residual disinfectant concentration is not detectable in more than 5 percent of the samples collected in each month, for two consecutive months that the supplier supplies water to the public.</p>	<p>8.3.4(a)(2)</p>
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<p>system, measured as total chlorine, combined chlorine, or chlorine dioxide, as specified in §141.74 (a)(2) and (c)(3), cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in §141.74(a)(1), is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 percent in one month, for any two consecutive months.</p> $V = ((c+d+e)/(a+b)) * 100$ <p>where:</p> <p>a=number of instances where the residual disinfectant concentration is measured;</p> <p>b=number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;</p> <p>c=number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;</p> <p>141.72(b)(3)(i)</p>	<p>If the supplier is monitoring for heterotrophic bacteria instead of residual disinfectant concentration, heterotrophic bacteria concentrations less than or equal to 500 CFU/ml are considered to have a detectable residual disinfectant concentration for purposes of determining compliance with the treatment technique requirement specified in 8.3.2(a)(2)(ii) and must be included with the reporting requirements specified in 8.3.6(b)(3).</p>	<p>C14</p> <p>8.3.7(a)(1)</p>
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	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified in §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(3)(i) of this section do not apply.</p>	<p><i>state cites the entire disinfection section</i> <i>Ed city is specific</i> If the supplier is monitoring for heterotrophic bacteria, the supplier is not required to comply with the requirements for the distribution system residual disinfectant concentration specified in this section (8.3 if the Department determines that the supplier meets all of the following criteria:</p>	<p>C15</p>
141.72(b)(3)(ii)	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified in §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(3)(i) of this section do not apply.</p>	<p><i>not included</i></p>	<p>C15</p>
141.72(b)(3)(iii)	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified in §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(3)(i) of this section do not apply.</p>	<p><i>not equivalent</i> Not capable of having a sample transported and analyzed for HPC by a certified laboratory within the required time and temperature conditions specified by approved analytical methods.</p>	<p>C15</p>

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	<p>A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in §141.71 (a) and (b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a), (b), (c), (d), or (e) of this section by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in §141.71 (a) and (b), whichever is later. Failure to meet any requirement of this section after the date specified in this introductory paragraph is a treatment technique violation.</p>	<p><i>not included</i></p> <p>The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: <u>Cryptosporidium</u>, <u>Giardia lamblia</u>, <u>viruses</u>, <u>Heterotrophic Plate Count</u> <u>bacteria</u>, <u>Legionella</u>, and <u>turbidity</u>. These treatment techniques are as follows:</p>	<p>C16 L5</p>	8.1.2(a)
141.73	<p>A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in §141.71 (a) and (b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a), (b), (c), (d), or (e) of this section by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in §141.71 (a) and (b), whichever is later. Failure to meet any requirement of this section after the date specified in this introductory paragraph is a treatment technique violation.</p>	<p><i>same</i></p> <p>For all surface water systems, the supplier must comply with the requirements specified in this section, (8.2)</p>	<p>C16</p>	8.2.1(a)

	<p>A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in §141.71 (a) and (b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a), (b), (c), (d), or (e) of this section by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in §141.71 (a) and (b), whichever is later. Failure to meet any requirement of this section after the date specified in this introductory paragraph is a treatment technique violation.</p>		C16
141.73	<p>A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in §141.71 (a) and (b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a), (b), (c), (d), or (e) of this section by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in §141.71 (a) and (b), whichever is later. Failure to meet any requirement of this section after the date specified in this introductory paragraph is a treatment technique violation.</p>	<p>The combined filter effluent treatment technique requirements are as follows:</p> <p><i>See comment 10</i></p> <p>The following constitute combined filter effluent treatment technique violations:</p>	<p>8.2.2(a)</p> <p>C16</p>
141.73	<p>is a treatment technique violation.</p>		<p>8.2.4(a)</p>

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	<p>A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in §141.71 (a) and (b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a), (b), (c), (d), or (e) of this section by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in §141.71 (a) and (b), whichever is later. Failure to meet any requirement of this section after the date specified in this introductory paragraph is a treatment technique violation.</p>	<p>More than 5 percent of turbidity monitoring results in any month are greater than (>) the applicable 95th percentile limits specified in Table 8-1.</p>	<p>C16</p> <p>8.2.4(a)(1)</p>
141.73	<p>A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in §141.71 (a) and (b) for avoiding filtration, must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a), (b), (c), (d), or (e) of this section by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration in §141.71 (a) and (b), whichever is later. Failure to meet any requirement of this section after the date specified in this introductory paragraph is a treatment technique violation.</p>	<p>At any time a turbidity monitoring result is greater than (>) the applicable maximum turbidity limit specified in Table 8-1.</p>	<p>C16</p> <p>8.2.4(a)(2)</p>
141.73(a)	<p>Conventional filtration treatment or direct filtration.</p>	<p>no state cite</p>	<p>C17</p>

	For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.5 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1), except that if the State determines that the system is capable of achieving at least 99.9 percent removal and/or inactivation of Giardia lamblia cysts at some turbidity level higher than 0.5 NTU in at least 95 percent of the measurements taken each month, the State may substitute this higher turbidity limit for that system. However, in no case may the State approve a turbidity limit that allows more than 1 NTU in more than 5 percent of the samples taken each month, measured as specified in §141.74 (a)(1) and (c)(1).		<i>supported by supp 127 if sure 127</i>	<i>N/A</i>
141.73(a)(1)	The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in §141.74 (a)(1) and (c)(1).	<i>11</i>		<i>2/19</i>
141.73(a)(2)	<i>141.173a → contains a ref to 141.74 a/c not included in 8.1.2</i>	The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows:		<i>C18</i>
141.73(a)(3)	Beginning January 1, 2002, systems serving at least 10,000 people must meet the turbidity requirements in §141.173(a).	When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this subsection, 8.1.2, no later than 18 months after receiving written notification from the Department of the source's reclassification.	<i>C18</i>	8.1.2(d)
141.73(a)(3)	Beginning January 1, 2002, systems serving at least 10,000 people must meet the turbidity requirements in §141.173(a).			3 /

141.73(a)(3)	Beginning January 1, 2002, systems serving at least 10,000 people must meet the turbidity requirements in §141.173(a).	For all surface water systems, the supplier must comply with the requirements specified in this section, 8.2.	C18 8.2.1(a)
141.73(a)(3)	Beginning January 1, 2002, systems serving at least 10,000 people must meet the turbidity requirements in §141.173(a).	The combined filter effluent treatment technique requirements are as follows:	C18 8.2.2(a)
141.73(a)(3)	Beginning January 1, 2002, systems serving at least 10,000 people must meet the turbidity requirements in §141.173(a). <i>no ref to 141.74 etc</i>	When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this subsection, 8.2.2, no later than 18 months after receiving written notification from the Department of the source's reclassification.	C18 8.2.2(c)
141.73(a)(3)	Beginning January 1, 2002, systems serving at least 10,000 people must meet the turbidity requirements in §141.173(a).	When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this subsection, 8.2.3, no later than when filtration is installed.	C18 8.2.3(c)
141.73(a)(4)	Beginning January 1, 2005, systems serving fewer than 10,000 people must meet the turbidity requirements in §141.550 through 141.553.	At the combined filter effluent, the supplier must:	C19 8.2.2(a)(1)
141.73(b)	Slow sand filtration	Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.	D104 8.2.2(a)(1)(ii)
141.73(b)	Slow sand filtration	The following constitute combined filter effluent treatment technique violations:	D104 8.2.4(a)
141.73(b)	Slow sand filtration	At any time a turbidity monitoring result is greater than (>) the applicable maximum turbidity limit specified in Table 8-1.	D104 8.2.4(a)(2)

	For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1), except that if the State determines there is no significant interference with disinfection at a higher turbidity level, the State may substitute this higher turbidity limit for that system.	SS included in Table not not included	C20 LS
141.73(b)(1)	For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1), except that if the State determines there is no significant interference with disinfection at a higher turbidity level, the State may substitute this higher turbidity limit for that system.	Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month.	8.2.2(a)(1)(i)
141.73(b)(1)	For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1), except that if the State determines there is no significant interference with disinfection at a higher turbidity level, the State may substitute this higher turbidity limit for that system.	For systems using slow sand filtration, the Department may allow an elevated turbidity level if the Department determines there is no significant interference with disinfection at the elevated turbidity limit for that system.	C20 LS
141.73(b)(1)	For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1), except that if the State determines there is no significant interference with disinfection at a higher turbidity level, the State may substitute this higher turbidity limit for that system.	The following constitute combined filter effluent treatment technique violations:	C20 LS 8.2.4(a)

	For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1), except that if the State determines there is no significant interference with disinfection at a higher turbidity level, the State may substitute this higher turbidity limit for that system.			C20 LS
141.73(b)(1)	The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in §141.74 (a)(1) and (c)(1).	More than 5 percent of turbidity monitoring results in any month are greater than (>) the applicable 95th percentile limits specified in Table 8-1.		8.2.4(a)(1)
141.73(b)(2)	The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in §141.74 (a)(1) and (c)(1).	Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times. <i>not included</i>		C21 LS 8.2.2(a)(1)(ii)
141.73(b)(2)	The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in §141.74 (a)(1) and (c)(1).	The following constitute combined filter effluent treatment technique violations: At any time a turbidity monitoring result is greater than (>) the applicable maximum turbidity limit specified in Table 8-1.		C21 LS 8.2.4(a)
141.73(b)(2)	The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in §141.74 (a)(1) and (c)(1).	At the combined filter effluent, the supplier must:		C21 LS 8.2.4(a)(2)
141.73(c)	Diatomaceous earth filtration.			8.2.2(a)(1)
141.73(c)(1)	For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1).	<i>Included in table</i> Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month. <i>not included</i>		C22 LS 8.2.2(a)(1)(i)
141.73(c)(1)	For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1).	The following constitute combined filter effluent treatment technique violations:		C22 LS 8.2.4(a)

	For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74 (a)(1) and (c)(1).	More than 5 percent of turbidity monitoring results in any month are greater than (>) the applicable 95th percentile limits specified in Table 8-1.	C22 LS
141.73(c)(1)	The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in §141.74 (a)(1) and (c)(1).	Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times. <i>not included</i>	C23 LS
141.73(c)(2)	The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in §141.74 (a)(1) and (c)(1).	The following constitute combined filter effluent treatment technique violations:	C23 LS
141.73(c)(2)	The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in §141.74 (a)(1) and (c)(1).	At any time a turbidity monitoring result is greater than (>) the applicable maximum turbidity limit specified in Table 8-1.	C23 LS
141.73(c)(2)	Other filtration technologies. A public water system may use a filtration technology not listed in paragraphs (a) through (c) of this section if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of paragraph (b) of this section apply. Beginning January 1, 2002, systems serving at least 10,000 people must meet the requirements for other filtration technologies in §141.173(b). Beginning January 14, 2005, systems serving fewer than 10,000 people must meet the requirements for other filtration technologies in §141.550 through 141.553.	<i>not included</i>	C24 LS
141.73(d)		Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.	8.2.2(a)(1)(ii)

141.73(d)	<p>Other filtration technologies. A public water system may use a filtration technology not listed in paragraphs (a) through (c) of this section if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of paragraph (b) of this section apply.</p> <p>Beginning January 1, 2002, systems serving at least 10,000 people must meet the requirements for other filtration technologies in §141.173(b). Beginning January 14, 2005, systems serving fewer than 10,000 people must meet the requirements for other filtration technologies in §141.550 through 141.553.</p>	<p><i>not included</i></p>	<p>(214 L5</p> <p>8.2.4(a)</p>
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	<p>Other filtration technologies. A public water system may use a filtration technology not listed in paragraphs (a) through (c) of this section if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of paragraph (b) of this section apply. Beginning January 1, 2002, systems serving at least 10,000 people must meet the requirements for other filtration technologies in §141.173(b). Beginning January 14, 2005, systems serving fewer than 10,000 people must meet the requirements for other filtration technologies in §141.550 through 141.553.</p>	<p>At any time a turbidity monitoring result is greater than (>) the applicable maximum turbidity limit specified in Table 8-1.</p>	
141.73(d)			8.2.4(a)(2)
141.74	Analytical Laboratory	Turbidity and Heterotrophic Plate Count Analytical Requirements	C25 46.7
141.74		Calculating Contact Time Values	C25 46.14

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<p>141.74(a)</p>	<p>Analytical requirements. Only the analytical method(s) specified in this paragraph, or otherwise approved by EPA, may be used to demonstrate compliance with §§141.71, 141.72 and 141.73. Measurements for pH, turbidity, temperature and residual disinfectant concentrations must be conducted by a person approved by the State. Measurement for total coliforms, fecal coliforms and HPC must be conducted by a laboratory certified by the State or EPA to do such analysis. Until laboratory certification criteria are developed for the analysis of fecal coliforms and HPC, any laboratory certified for total coliforms analysis by the State or EPA is deemed certified for fecal coliforms and HPC analysis. The following procedures shall be conducted in accordance with the publications listed in the following section. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the methods published in Standard Methods for the Examination of Water and Wastewater may be obtained from the American Public Health Association et al, 1015 Fifteenth Street, NW, Washington, DC 20005; copies of the Minimal Medium ONPG-MUG Method as set forth in the article "National Field Evaluation of a Defined</p>	<p>not included in Article 46 not included crosswalk</p>	<p>C26</p> <p>46.7(a)</p>
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<p>141.74(a)</p>	<p>Analytical requirements. Only the analytical method(s) specified in this paragraph, or otherwise approved by EPA, may be used to demonstrate compliance with §§141.71, 141.72 and 141.73. Measurements for pH, turbidity, temperature and residual disinfectant concentrations must be conducted by a person approved by the State. Measurement for total coliforms, fecal coliforms and HPC must be conducted by a laboratory certified by the State or EPA to do such analysis. Until laboratory certification criteria are developed for the analysis of fecal coliforms and HPC, any laboratory certified for total coliforms analysis by the State or EPA is deemed certified for fecal coliforms and HPC analysis. The following procedures shall be conducted in accordance with the publications listed in the following section. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of the methods published in Standard Methods for the Examination of Water and Wastewater may be obtained from the American Public Health Association et al., 1015 Fifteenth Street, NW., Washington, DC 20005; copies of the Minimal Medium ONPG-MUG Method as set forth in the article "National Field Evaluation of a Defined</p>	<p>C 2.6</p> <p>The testing requirements and analytical methods for free chlorine, chloramines, chlorine dioxide, and ozone are specified in 40 CFR 141.74(a), 40 CFR 141.131(a), and 40 CFR 141.131(c) as amended July 1, 2013.</p> <p>46.8.2(a)</p>
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141.74(a)(1)	<p>Public water systems must conduct analysis of pH and temperature in accordance with one of the methods listed at §141.23(k)(1). Public water systems must conduct analysis of total coliforms, fecal coliforms, heterotrophic bacteria, and turbidity in accordance with one of the following analytical methods or one of the alternative methods listed in appendix A to subpart C of this part and by using analytical test procedures contained in Technical Notes on Drinking Water Methods, EPA-600/R-94-173, October 1994. This document is available from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242-0419 or http://www.epa.gov/nscep/</p>	<p><i>45 cite more generally as 141.74(a)</i></p> <p><i>not included in crosswalk</i></p> <p>The testing requirements and analytical methods for total coliform analysis are specified in 40 CFR 141.21(f)(3) as amended July 1, 2013.</p>	C27 46.2.1(a)
141.74(a)(1)	<p>Public water systems must conduct analysis of pH and temperature in accordance with one of the methods listed at §141.23(k)(1). Public water systems must conduct analysis of total coliforms, fecal coliforms, heterotrophic bacteria, and turbidity in accordance with one of the following analytical methods or one of the alternative methods listed in appendix A to subpart C of this part and by using analytical test procedures contained in Technical Notes on Drinking Water Methods, EPA-600/R-94-173, October 1994. This document is available from the National Service Center for Environmental Publications (NSCEP), P.O. Box 42419, Cincinnati, OH 45242-0419 or http://www.epa.gov/nscep/</p>	<p><i>not included</i></p> <p>The testing requirements and analytical methods for turbidity and HPC are specified in 40 CFR 141.74(a) as amended July 1, 2013.</p>	C27 46.7(a)

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141.74(a)(2)	<p>Public water systems must measure residual disinfectant concentrations with one of the analytical methods in the following table or one of the alternative methods listed in appendix A to subpart C of this part. If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine also may be measured by using DPD colorimetric test kits. In addition States may approve the use of the ITS free chlorine test strip for the determination of free chlorine. Use of the test strips is described in Method D99-003, "Free Chlorine Species (HOCl and OCl-) by Test Strip," Revision 3.0, November 21, 2003, available from Industrial Test Systems, Inc., 1875 Langston St., Rock Hill, SC 29730. Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision remain the same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five days, or with a protocol approved by the State.</p>	<p>The testing requirements and analytical methods for free chlorine, chloramines, chlorine dioxide, and ozone are specified in 40 CFR 141.74(a), 40 CFR 141.131(a), and 40 CFR 141.131(c) as amended July 1, 2013.</p> <p><i>these are generally what includes 141.74(a)(2)</i></p>	<p>46.8.2(a)</p>
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table not included

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	<p>Monitoring requirements for systems that do not provide filtration. A public water system that uses a surface water source and does not provide filtration treatment must begin monitoring, as specified in this paragraph (b), beginning December 31, 1990, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii), in which case the State may specify alternative monitoring requirements, as appropriate, until filtration is in place.</p>		<p>CS9 LS3</p>
141.74(b)	<p>141.74(b)</p> <p>Fecal coliform or total coliform density measurements as required by §141.71(a)(1) must be performed on representative source water samples immediately prior to the first or only point of disinfectant application. The system must sample for fecal or total coliforms at the following minimum frequency each week the system serves water to the public:</p>	<p>not included</p> <p>not included</p> <p>state does not allow avoidance criteria</p>	<p>more stringent</p>
141.74(b)(1)			

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141.74(b)(2)	Turbidity measurements as required by §141.71(a)(2) must be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State.		11
141.74(b)(3)	The total inactivation ratio for each day that the system is in operation must be determined based on the CT99.9 values in tables 1.1–1.6, 2.1, and 3.1 of this section, as appropriate. The parameters necessary to determine the total inactivation ratio must be monitored as follows:	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	Adopted 6/9/08 46.14(a)
141.74(b)(3)(i)	The temperature of the disinfected water must be measured at least once per day at each residual disinfectant concentration sampling point.	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	11 46.14(a)
141.74(b)(3)(ii)	If the system uses chlorine, the pH of the disinfected water must be measured at least once per day at each chlorine residual disinfectant concentration sampling point.	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	11 46.14(a)
141.74(b)(3)(iii)	The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	11 46.14(a)
141.74(b)(3)(iv)	The residual disinfectant concentration(s) ("C") of the water before or at the first customer must be measured each day during peak hourly flow.	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	11 46.14(a)

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141.74(b)(3)(v)	If a system uses a disinfectant other than chlorine, the system may demonstrate to the State, through the use of a State-approved protocol for on-site disinfection challenge studies or other information satisfactory to the State, that CT99.9 values other than those specified in tables 2.1 and 3.1 in this section other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by §141.72(a)(1).		
141.74(b)(4)	The total inactivation ratio must be calculated as follows:	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	46.14(a)
141.74(b)(4)(i)	If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio based on either of the following two methods:	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	46.14(a)
141.74(b)(4)(i)(A)	One inactivation ratio (CT _{calc} /CT _{99.9}) is determined before or at the first customer during peak hourly flow and if the CT _{calc} /CT _{99.9} = 1.0, the 99.9 percent Giardia lamblia inactivation requirement has been achieved; or	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	46.14(a)
141.74(b)(4)(i)(B)	Successive CT _{calc} /CT _{99.9} values, representing sequential inactivation ratios, are determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the following method must be used to calculate the total inactivation ratio:	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	46.14(a)
141.74(b)(4)(i)(B)(1)	Determine (CT _{calc} /CT _{99.9}) for each sequence	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	46.14(a)
141.74(b)(4)(i)(B)(2)	Add the (CT _{calc} /CT _{99.9}) values together ? (CT _{calc} /CT _{99.9})	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	46.14(a)

141.74(b)(4)(i)(B)(3)	If ? (CTcalc/CT99.9) = 1.0, the 99.9 percent Giardia lamblia inactivation requirement has been achieved.	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	// 46.14(a)
	If the system uses more than one point of disinfectant application before or at the first customer, the system must determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The CTcalc/CT99.9 value of each sequence and ?CTcalc/CT99.9 must be calculated using the method in paragraph (b)(4)(i)(B) of this section to determine if the system is in compliance with §141.72(a).		//
141.74(b)(4)(ii)	Although not required, the total percent inactivation for a system with one or more points of residual disinfectant concentration monitoring may be calculated by solving the following equation:	The requirements for calculating contact time values are specified in 40 CFR 141.74(b)(3-4) as amended July 1, 2013.	// 46.14(a)
141.74(b)(4)(iii)	The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies prescribed below:	<i>State does not follow avoidance criteria</i>	<i>more stringent</i>
141.74(b)(5)			

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	<p>The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in §141.21, except that the State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in paragraph (a)(3) of this section, may be measured in lieu of residual disinfectant concentration.</p>	11	11
141.74(b)(6)(i)	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by paragraph (a)(1) of this section and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(6)(i) of this section do not apply to that system.</p>	11	11
141.74(c)	<p>Monitoring requirements for systems using filtration treatment. A public water system that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with this paragraph (c) beginning June 29, 1993, or when filtration is installed, whichever is later.</p>	<p>When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this subsection, 8.2.2, no later than 18 months after receiving written notification from the Department of the source's reclassification.</p> <p>old, turning C30</p>	8.2.2(c)

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	Monitoring requirements for systems using filtration treatment. A public water system that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with this paragraph (c) beginning June 29, 1993, or when filtration is installed, whichever is later.	To determine compliance with the combined filter effluent treatment technique requirements, the supplier must monitor turbidity at least every four hours at a location(s) representative of the combined filter effluent.	C 70
141.74(c)	Monitoring requirements for systems using filtration treatment. A public water system that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with this paragraph (c) beginning June 29, 1993, or when filtration is installed, whichever is later.	Disinfection DH When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with the requirements specified in this subsection, 8.2.3, no later than when filtration is installed.	C 30 8.2.3(c)
141.74(c)	Monitoring requirements for systems using filtration treatment. A public water system that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with this paragraph (c) beginning June 29, 1993, or when filtration is installed, whichever is later.	State ref is 8.2.1(a) & 8.3.1(a) crosswalk defined When the Department determines that a groundwater source is under the direct influence of surface water, and therefore the system is reclassified as a surface water system, the supplier must comply with all of the following:	C 30 8.3.1(b)

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141.74(c)	Monitoring requirements for systems using filtration treatment. A public water system that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with this paragraph (c) beginning June 29, 1993, or when filtration is installed, whichever is later.	All requirements specified in this section, 8.3, no later 18 months after written notification from the Department of the decision to change the source's classification or no later than when the filtration is installed, whichever is sooner.	C 30 8.3.1(b)(2)
141.74(c)	Monitoring requirements for systems using filtration treatment. A public water system that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment must monitor in accordance with this paragraph (c) beginning June 29, 1993, or when filtration is installed, whichever is later.	To determine compliance with the disinfection treatment technique requirements, the supplier must monitor the residual disinfectant concentration.	C 30 8.3.3(a)

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<p>141.74(c)(1)</p>	<p>Turbidity measurements as required by §141.73 must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the State may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving 500 or fewer persons, the State may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the State determines that less frequent monitoring is sufficient to indicate effective filtration performance.</p>	<p>not 141.74(c)(1) public supply</p> <p>To determine compliance with the combined filter effluent treatment technique requirements, the supplier must monitor turbidity at least every four hours at a location(s) representative of the combined filter effluent.</p>	<p>C3) LS?</p> <p>8.2.3(a)</p>
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	<p>Turbidity measurements as required by §141.73 must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the State may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving 500 or fewer persons, the State may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the State determines that less frequent monitoring is sufficient to indicate effective filtration performance.</p>	<p>not included 141.73 itself includes combined §16-C24 not included in crosswalk 04</p> <p>The supplier may monitor turbidity continuously if the supplier validates the continuous monitoring equipment for accuracy at a Department-approved regular frequency and using a Department-approved protocol.</p>	<p>C31 LS?</p>
141.74(c)(1)	filtration performance.		8.2.3(a)(1)

50

	<p>Turbidity measurements as required by §141.73 must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the State may reduce the sampling frequency to once per day if it determines that <u>less frequent monitoring is sufficient to indicate effective filtration performance</u>. For systems serving 500 or fewer persons, the State may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the State determines that less frequent monitoring is sufficient to indicate effective filtration performance.</p>		<p>C31</p> <p>8.2.3(a)(2)</p>
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	<p>Turbidity measurements as required by §141.73 must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the State may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving 500 or fewer persons, the State may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the State determines that less frequent monitoring is sufficient to indicate effective filtration performance.</p>		<p>C 31</p> <p>8.2.3(a)(2)(i)</p>
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141.74(c)(1)

filtration performance.

The system uses filtration treatment other than conventional filtration treatment, direct filtration, or diatomaceous earth filtration.

	<p>Turbidity measurements as required by §141.73 must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the State may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance. For systems serving 500 or fewer persons, the State may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the State determines that less frequent monitoring is sufficient to indicate effective filtration performance.</p>		<p>C31</p>
141.74(c)(1)		The system supplies less than or equal to (=) 500 people.	8.2.3(a)(2)(ii)

	<p>The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:</p> <p>If at any time the residual disinfectant concentration falls below 0.2 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/L.</p>	<p>At each entry point, the supplier must continuously monitor the residual disinfectant concentration.</p>	<p>D/104</p> <p>8.3.3(a)(1)</p>
<p>141.74(c)(2)</p>			

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table not included

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	<p>The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:</p> <p>If at any time the residual disinfectant concentration falls below 0.2 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/L.</p>	<p>The supplier must record the lowest monitoring result each day.</p>	<p>8.3.3(e)(1)(i)</p>
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D/oh

141.74(c)(2)	<p>The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:</p> <p>If at any time the residual disinfectant concentration falls below 0.2 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/L.</p>	<p><i>new language - OH</i></p> <p>If there is a failure of the continuous monitoring equipment, the supplier must monitor the residual disinfectant concentration by collecting a grab sample no later than four hours after the equipment failure and continue collecting grab samples every four hours until the continuous monitoring equipment is returned to service.</p>	<p><i>D/oh</i></p> <p>8.3.3(a)(1)(ii)</p>
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	<p>The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:</p> <p>If at any time the residual disinfectant concentration falls below 0.2 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/L.</p>	<p>The supplier must resume continuous residual disinfectant concentration monitoring no later than five working days after the equipment failure.</p> <p><i>said differently 6/1/04</i></p>	<p>8.3.3(a)(1)(ii)(A)</p>
141.74(c)(2)			

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	<p>The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving <u>3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:</u></p> <p>If at any time the residual disinfectant concentration falls below 0.2 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/L.</p>	<p>For systems supplying less than or equal to <u>(=) 3,300 people, the supplier is not required to monitor continuously if the supplier collects grab samples at the frequency specified in Table 8-2.</u></p>	<p>8.3.3(a)(1)(iii)</p> <p>D/104</p>
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141.74(c)(2)

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	<p>The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:</p> <p>If at any time the residual disinfectant concentration falls below 0.2 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/L.</p>	<p>if more than one sample per day is required, the supplier must collect the samples throughout the day. The sampling intervals are subject to Department approval.</p> <p><i>Table 04 Footnote is included</i></p>	<p>D/04</p> <p>8.3.3(a)(1)(iii)(A)</p>
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	<p>The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment, and systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at the frequencies each day prescribed below:</p> <p>If at any time the residual disinfectant concentration falls below 0.2 mg/L in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/L.</p>	<p><i>per 10/10/04</i></p> <p>If any grab sample result is less than ($<$) 0.2 mg/L, the supplier must increase the monitoring frequency of the residual disinfectant concentration at that entry point to at least every four hours until the residual disinfectant concentration is greater than or equal to ($=$) 0.2 mg/L.</p>	<p><i>D/04</i></p> <p>8.3.3(a)(1)(iii)(B)</p>
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141.74(c)(3)(i)	<p>The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in §141.21, except that the State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in paragraph (a)(1) of this section, may be measured in lieu of residual disinfectant concentration.</p>	<p>ref included</p> <p>In the distribution system, the supplier must monitor the residual disinfectant concentration at the same time and at same sampling locations that total coliform samples are collected under 17.3.</p>	<p>C92 CS2</p> <p>8.3.3(a)(2)</p>
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141.74(c)(3)(i)	<p>The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in §141.21, except that the State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in paragraph (a)(1) of this section, may be measured in lieu of residual disinfectant concentration.</p>	<p>The purpose is to shift monitoring to the disinfected part of system</p> <p>For systems using surface water and groundwater sources, the Department may allow the supplier to collect residual disinfectant concentration samples at locations other than the total coliform sampling locations if the Department determines that other locations are more representative of finished water quality in the distribution system.</p>	<p>8.3.3(a)(2)(ii)</p>
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C32-LS?

	<p>The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in §141.21, except that the State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in paragraph (a)(1) of this section, may be measured in lieu of residual disinfectant concentration.</p>		
141.74(c)(3)(i)		<p>In the distribution system, the supplier may monitor for heterotrophic bacteria, measured as Heterotrophic Plate Count (HPC), instead of residual disinfectant concentration.</p>	8.3.7(a)
141.74(c)(3)(ii)	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by paragraph (a)(1) of this section and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (c)(3)(i) of this section do not apply to that system.</p>	<p>If the supplier is monitoring for heterotrophic bacteria, the supplier is not required to comply with the requirements for the distribution system residual disinfectant concentration specified in this section, 8.3 if the Department determines that the supplier meets all of the following criteria:</p>	8.3.7(a)(2)

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	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by paragraph (a)(1) of this section and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (c)(3)(i) of this section do not apply to that system.</p>		<p>C 33 LS</p>
141.74(c)(3)(ii)	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by paragraph (a)(1) of this section and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (c)(3)(i) of this section do not apply to that system.</p>	<p>Providing adequate disinfection in the distribution system.</p>	<p>8.3.7(a)(2)(i)</p>
141.74(c)(3)(ii)	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by paragraph (a)(1) of this section and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (c)(3)(i) of this section do not apply to that system.</p>	<p>Not capable of having a sample transported and analyzed for HPC by a certified laboratory within the required time and temperature conditions specified by approved analytical methods.</p>	<p>C 33 LS 8.3.7(a)(2)(ii)</p>

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	A public water system that uses a surface water source and does not provide filtration treatment must report monthly to the State the information specified in this paragraph (a) beginning December 31, 1990, unless the State has determined that filtration is required in writing pursuant to section 1412(b)(7)(C)(iii), in which case the State may specify alternative reporting requirements, as appropriate, until filtration is in place. A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must report monthly to the State the information specified in this paragraph (a) beginning December 31, 1990, or 6 months after the State determines that the ground water source is under the direct influence of surface water, whichever is later, unless the State has determined that filtration is required in writing pursuant to §1412(b)(7)(C)(iii), in which case the State may specify alternative reporting requirements, as appropriate, until filtration is in place.		
141.75(a)	Source water quality information must be reported to the State within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:		
141.75(a)(1)	The cumulative number of months for which results are reported.		
141.75(a)(1)(i)	The number of fecal and/or total coliform samples, whichever are analyzed during the month (if a system monitors for both, only fecal coliforms must be reported), the dates of sample collection, and the dates when the turbidity level exceeded 1 NTU.		

141.75(a)(1)(iii)	The number of samples during the month that had equal to or less than 20/100 ml fecal coliforms and/or equal to or less than 100/100 ml total coliforms, whichever are analyzed.		
141.75(a)(1)(iv)	The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous six months the system served water to the public.		
141.75(a)(1)(v)	The cumulative number of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed, during the previous six months the system served water to the public.		
141.75(a)(1)(vi)	The percentage of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed, during the previous six months the system served water to the public.		
141.75(a)(1)(vii)	The maximum turbidity level measured during the month, the date(s) of occurrence for any measurement(s) which exceeded 5 NTU, and the date(s) the occurrence(s) was reported to the State.		
141.75(a)(1)(viii)	For the first 12 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after one year of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 12 months the system served water to the public.		

	For the first 120 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after 10 years of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 120 months the system served water to the public.	11	11
141.75(a)(1)(ix)	Disinfection information specified in §141.74(b) must be reported to the State within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:	11	11
141.75(a)(2)	For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.	11	11
141.75(a)(2)(i)	The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the State was notified of the occurrence.	11	11
141.75(a)(2)(ii)	The daily residual disinfectant concentration(s) (in mg/l) and disinfectant contact time(s) (in minutes) used for calculating the CT value(s).	11	11
141.75(a)(2)(iii)	If chlorine is used, the daily measurement(s) of pH of disinfected water following each point of chlorine disinfection	11	11
141.75(a)(2)(iv)	The daily measurement(s) of water temperature in °C following each point of disinfection.	11	11
141.75(a)(2)(v)	The daily CTcalc and CTcalc/CT99.9 values for each disinfectant measurement or sequence and the sum of all CTcalc/CT99.9 values ((CTcalc/CT99.9)) before or at the first customer.	11	11
141.75(a)(2)(vi)			

	The daily determination of whether disinfection achieves adequate Giardia cyst and virus inactivation, i.e., whether (CTcalc/CT99.9) is at least 1.0 or, where disinfectants other than chlorine are used, other indicator conditions that the State determines are appropriate, are met.		11
141.75(a)(2)(vii)	The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to §141.72:		11
141.75(a)(2)(viii)	Number of instances where the residual disinfectant concentration is measured;	11	11
141.75(a)(2)(viii)(A)	Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;	11	11
141.75(a)(2)(viii)(B)	Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;	11	11
141.75(a)(2)(viii)(C)	Number of instances where the residual disinfectant concentration is detected and where HPC is >500/ml;	11	11
141.75(a)(2)(viii)(D)	Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml;	11	11

	<p>For the current and previous month the system served water to the public, the value of "V" in the following formula:</p> $V = ((c+d+e)/(a+b)) * 100$ <p>where:</p> <p>a=the value in paragraph (a)(2)(viii)(A) of this section,</p> <p>b=the value in paragraph (a)(2)(viii)(B) of this section,</p> <p>c=the value in paragraph (a)(2)(viii)(C) of this section,</p> <p>d=the value in paragraph (a)(2)(viii)(D) of this section, and</p> <p>e=the value in paragraph (a)(2)(viii)(E) of this section.</p>	//	//
141.75(a)(2)(viii)(F)	e=the value in paragraph (a)(2)(viii)(E) of this section.		
	<p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions specified by §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (a)(2)(viii) (A)–(F) of this section do not apply to that system.</p>	//	//
141.75(a)(2)(viii)(G)	that system.		
141.75(a)(2)(ix)	<p>A system need not report the data listed in paragraphs (a)(2)(i), and (iii)–(vi) of this section if all data listed in paragraphs (a)(2)(i)–(viii) of this section remain on file at the system, and the State determines that:</p>	//	//

	The system has submitted to the State all the information required by paragraphs (a)(2) (i)-(viii) of this section for at least 12 months; and		
141.75(a)(2)(ix)(A)		//	//
141.75(a)(2)(ix)(B)	The State has determined that the system is not required to provide filtration treatment.	//	//
	No later than ten days after the end of each Federal fiscal year (September 30), each system must provide to the State a report which summarizes its compliance with all watershed control program requirements specified in §141.71(b)(2).	//	//
141.75(a)(3)			
	No later than ten days after the end of each Federal fiscal year (September 30), each system must provide to the State a report on the on-site inspection conducted during that year pursuant to §141.71(b)(3), unless the on-site inspection was conducted by the State. If the inspection was conducted by the State, the State must provide a copy of its report to the public water system.	//	//
141.75(a)(4)			
	Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, must report that occurrence to the State as soon as possible, but no later than by the end of the next business day.	//	//
141.75(a)(5)(i)			
	If at any time the turbidity exceeds 5 NTU, the system must consult with the primacy agency as soon as practical, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under §141.203(b)(3).	//	//
141.75(a)(5)(ii)			

	if at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system must notify the State as soon as possible, but no later than by the end of the next business day. The system also must notify the State by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.		
141.75(a)(5)(iii)			
141.75(b)	A public water system that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment must report monthly to the State the information specified in this paragraph (b) beginning June 29, 1993, or when filtration is installed, whichever is later.	includes 141. not equivalent state city does not include all of For combined filter effluent turbidity monitoring results collected under 8.2.3, the supplier must submit the following information no later than the 10th of the following month:	C35 LS? 8.2.6(a)
141.75(b)	A public water system that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment must report monthly to the State the information specified in this paragraph (b) beginning June 29, 1993, or when filtration is installed, whichever is later.	not equivalent	C35 LS? 8.3.6(b)
141.75(b)	Turbidity measurements as required by §141.74(c)(1) must be reported within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:	For residual disinfectant concentration samples collected under 8.3.3, the supplier must submit all of the following information no later than the 10th of the following month: For combined filter effluent turbidity monitoring results collected under 8.2.3, the supplier must submit the following information no later than the 10th of the following month:	C36 LS? 8.2.6(a)
141.75(b)(1)	The total number of filtered water turbidity measurements taken during the month. <i>not included</i>	Number of combined filter effluent turbidity monitoring results recorded during the month.	C37 LS? 8.2.6(a)(1)
141.75(b)(1)(i)			
141.75(b)(1)(ii)	The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in §141.73 for the filtration technology being used. <i>1500 INVERSE</i>	Number and percentage of combined filter effluent turbidity monitoring results recorded during the month that were greater than (>) the turbidity limits specified in 8.2.2.	D104 8.2.6(a)(2)

141.75(b)(1)(iii)	The date and value of any turbidity measurements taken during the month which exceed 5 NTU.	The date and value of any combined filter effluent turbidity monitoring results collected during the month, which were greater than (>) the maximum turbidity limit. <i>no ref 40</i>	C38 LS?
	Disinfection information specified in §141.74(c) must be reported to the State within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:	<i>includes 141.74 c213 not equivalent</i> For residual disinfectant concentration samples collected under 8.3.3, the supplier must submit all of the following information no later than the 10th of the following month:	C29 LS? no 141.74 c11
141.75(b)(2)	For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.	<i>same - review definition for entry pt.</i> For each entry point, the lowest daily residual disinfectant concentration result in mg/L.	D104 8.3.6(b)(1)
141.75(b)(2)(i)	The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the State was notified of the occurrence.	The date and duration of each period when the entry point residual disinfectant concentration fell below 0.2 mg/L and when the Department was notified of the occurrence.	D104 8.3.6(b)(2)
141.75(b)(2)(iii)	The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to §141.72:	<i>not included</i> For distribution system residual disinfectant concentration samples:	C40 LS? 8.3.6(b)(3)
141.75(b)(2)(iii)	The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to §141.72:	The number of sample results that were undetectable.	C40 LS? 8.3.6(b)(3)(i)
141.75(b)(2)(iii)	The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to §141.72:	The percentage of sample results that were undetectable for each of the last two months.	C40 LS? 8.3.6(b)(3)(ii)
141.75(b)(2)(iii)(A)	Number of instances where the residual disinfectant concentration is measured;		C41 LS
141.75(b)(2)(iii)(B)	Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;		C41 LS
141.75(b)(2)(iii)(C)	Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;		C41 LS
141.75(b)(2)(iii)(D)	Number of instances where no residual disinfectant concentration is detected and where HPC is >500/ml;		C41 LS

141.75(b)(2)(iii)(E)	Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml; For the current and previous month the system serves water to the public, the value of "V" in the following formula: $V = ((c+d+e)/(a+b)) * 100$ where: a=the value in paragraph (b)(2)(iii)(A) of this section, b=the value in paragraph (b)(2)(iii)(B) of this section, c=the value in paragraph (b)(2)(iii)(C) of this section, d=the value in paragraph (b)(2)(iii)(D) of this section, and e=the value in paragraph (b)(2)(iii)(E) of this section.		C41 LS
141.75(b)(2)(iii)(G)	<p>regulator's required not equivalent</p> <p>If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory within the requisite time and temperature conditions specified by §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(2)(iii) (A)-(F) of this section do not apply.</p>	<p>If the supplier is monitoring for heterotrophic bacteria instead of residual disinfectant concentration, heterotrophic bacteria concentrations less than or equal to (≅) 500 CFU/ml are considered to have a detectable residual disinfectant concentration for purposes of determining compliance with the treatment technique requirement specified in 8.3.2(a)(2)(ii) and must be included with the reporting requirements specified in 8.3.6(b)(3).</p>	<p>C42 LS</p> <p>8.3.7(a)(1)</p>

141.75(b)(2)(iii)(G)	If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory within the requisite time and temperature conditions specified by §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(2)(iii) (A)–(F) of this section do not apply.	If the supplier is monitoring for heterotrophic bacteria, the supplier is not required to comply with the requirements for the distribution system residual disinfectant concentration specified in this section, 8.3 if the Department determines that the supplier meets all of the following criteria:	C42 LS 8.3.7(a)(2)
141.75(b)(2)(iii)(G)	If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory within the requisite time and temperature conditions specified by §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(2)(iii) (A)–(F) of this section do not apply.	Providing adequate disinfection in the distribution system.	C42 LS 8.3.7(a)(2)(i)
141.75(b)(2)(iii)(G)	If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory within the requisite time and temperature conditions specified by §141.74(a)(1) and that the system is providing adequate disinfection in the distribution system, the requirements of paragraph (b)(2)(iii) (A)–(F) of this section do not apply.	Not capable of having a sample transported and analyzed for HPC by a certified laboratory within the required time and temperature conditions specified by approved analytical methods.	C42 LS 8.3.7(a)(2)(ii)

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141.75(b)(2)(iv)	<p>A system need not report the data listed in paragraph (b)(2)(i) of this section if all data listed in paragraphs (b)(2) (i)-(iii) of this section remain on file at the system and the State determines that the system has submitted all the information required by paragraphs (b)(2) (i)-(iii) of this section for at least 12 months</p>	<p>If the Department determines that the supplier has submitted all the residual disinfectant concentration information as specified in 8.3.6(b)(1-3) for at least 12 months and the supplier keeps records of the information, the supplier is not required to submit the lowest daily entry point residual disinfectant concentration results as specified in 8.3.6(b)(1).</p>	8.3.6(c)
141.75(b)(3)(i)	<p>Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, must report that occurrence to the State as soon as possible, but no later than by the end of the next business day.</p>	<p>The supplier must notify the Department of any waterborne disease outbreak that is potentially attributable to the water system as soon as possible but no later than 24 hours after discovering the outbreak or potential outbreak.</p>	35.2(d)
141.75(b)(3)(ii)	<p>If at any time the turbidity exceeds 5 NTU, the system must consult with the primacy agency as soon as practical, but no later than 24 hours after the exceedance is known, in accordance with the public notification requirements under §141.203(b)(3).</p>	<p>In the event of a maximum combined filter effluent turbidity limit treatment technique violation, as specified in 8.2.4(a)(2), the supplier must consult with the Department as soon as possible but no later than 24 hours after the violation occurs.</p>	8.2.5(b)
141.75(b)(3)(iii)	<p>If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system must notify the State as soon as possible, but no later than by the end of the next business day. The system also must notify the State by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.</p>	<p>In the event of an entry point disinfection treatment technique violation as specified in 8.3.4(a)(1), the supplier must:</p>	8.3.5(a)
141.75(b)(3)(iii)	<p>If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system must notify the State as soon as possible, but no later than by the end of the next business day. The system also must notify the State by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.</p>	<p>Notify the Department no later than the end of the next business day.</p>	8.3.5(a)(1)

	If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system must notify the State as soon as possible, but no later than by the end of the next business day. The system also must notify the State by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.	If at any time the entry point residual disinfectant concentration is less than (<) 0.2 mg/L, the supplier must notify the Department as soon as possible but no later than the end of the next business day.	D/04
141.75(b)(3)(iii)	If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system must notify the State as soon as possible, but no later than by the end of the next business day. The system also must notify the State by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.	The supplier must also report, no later than the end of the next business day, whether the entry point residual disinfectant concentration was restored to at least 0.2 mg/L within four hours.	D/04
141.75(b)(3)(iii)	141.75(b)(3)(iii)	8.3.6(a)(1)	8.3.6(a)(1)
141.76	Recycle provisions	Surface Water Treatment Rule: Filter Backwash Recycle Rule	D/04
	Applicability. All subpart H systems that employ conventional filtration or direct filtration treatment and that recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes must meet the requirements in paragraphs (b) through (d) of this section.	state classifies systems as SW or G/L not to be used	D/04
141.76(a)	Applicability. All subpart H systems that employ conventional filtration or direct filtration treatment and that recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes must meet the requirements in paragraphs (b) through (d) of this section.	Applicability and Definitions	9.1
141.76(a)	Reporting. A system must notify the State in writing by December 8, 2003, if the system recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes. This notification must include, at a minimum, the information specified in paragraphs (b)(1) and (2) of this section.	For all surface water systems that use conventional filtration treatment or direct filtration treatment and that also recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes, the supplier must comply with the requirements specified in this article.	D/04
141.76(b)	Reporting. A system must notify the State in writing by December 8, 2003, if the system recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes. This notification must include, at a minimum, the information specified in paragraphs (b)(1) and (2) of this section.	needs to cross with needs to ref 9.1(a)	C45
141.76(b)	Reporting Requirements for Filter Backwash Recycle		9.4

	Reporting. A system must notify the State in writing by December 8, 2003, if the system recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes. This notification must include, at a minimum, the information specified in paragraphs (b)(1) and (2) of this section.		C45
141.76(b)	A plant schematic showing the origin of all flows which are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are re-introduced back into the treatment plant.	No later than 18 months after meeting the applicability of this article, the supplier must provide the Department with written notification that includes all of the following:	C46 C52
141.76(b)(1)	A plant schematic showing the origin of all flows which are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are re-introduced back into the treatment plant.	A plant schematic showing all of the following: does not include	C46 C52
141.76(b)(1)	A plant schematic showing the origin of all flows which are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are re-introduced back into the treatment plant.	The origin of all flows which are recycled.	9.4(a)(1)(i) C46 C52
141.76(b)(1)	A plant schematic showing the origin of all flows which are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are re-introduced back into the treatment plant.	The hydraulic conveyance used to transport the flows.	9.4(a)(1)(ii) C46 C52
141.76(b)(1)	A plant schematic showing the origin of all flows which are recycled (including, but not limited to, spent filter backwash water, thickener supernatant, and liquids from dewatering processes), the hydraulic conveyance used to transport them, and the location where they are re-introduced back into the treatment plant.	The location where the flows are re-introduced into the treatment plant.	9.4(a)(1)(iii) 77

141.76(b)(2)	Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and State-approved operating capacity for the plant where the State has made such determinations.	Typical recycle flow in gallons per minute.	12/04 9.4(a)(2)
141.76(b)(2)	Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and State-approved operating capacity for the plant where the State has made such determinations.	The highest observed plant flow experienced in the previous year in gallons per minute.	12/04 9.4(a)(3)
141.76(b)(2)	Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and State-approved operating capacity for the plant where the State has made such determinations.	Design flow for the treatment plant in gallons per minute.	12/04 9.4(a)(4)
141.76(b)(2)	Typical recycle flow in gallons per minute (gpm), the highest observed plant flow experienced in the previous year (gpm), design flow for the treatment plant (gpm), and State-approved operating capacity for the plant where the State has made such determinations.	Department-approved operating capacity for the plant.	12/04 9.4(a)(5)

	<p><u>Treatment technique requirement.</u> Any system that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes must return these flows through the processes of a system's existing conventional or direct filtration system as defined in §141.2 or at an alternate location approved by the State by June 8, 2004. If capital improvements are required to modify the recycle location to meet this requirement, all capital improvements must be completed no later than June 8, 2006.</p>	<p><i>Passed date 2/17</i></p> <p>Treatment Technique Requirement for Filter Backwash Recycle</p>	<p>C47 LS?</p>	9.2
141.76(c)	<p>Treatment technique requirement. Any system that recycles spent filter backwash water, thickener supernatant, or liquids from dewatering processes must return these flows through the processes of a system's existing conventional or direct filtration system as defined in §141.2 or at an alternate location approved by the State by June 8, 2004. If capital improvements are required to modify the recycle location to meet this requirement, all capital improvements must be completed no later than June 8, 2006.</p>	<p><i>141.76(c) less clean no not to 141.2</i></p> <p>The supplier must return recycled spent filter backwash water, thickener supernatant, or liquids from dewatering processes to a location within the treatment process that is before the conventional filtration treatment or direct filtration treatment or to an alternative Department-approved location.</p>	<p>C47 LS?</p>	9.2(a)
141.76(d)	<p>Recordkeeping. The system must collect and retain on file recycle flow information specified in paragraphs (d)(1) through (6) of this section for review and evaluation by the State beginning June 8, 2004.</p>	<p>Information Collection Requirements for Filter Backwash Recycle</p>	<p>D/04</p>	9.3
141.76(d)	<p>Recordkeeping. The system must collect and retain on file recycle flow information specified in paragraphs (d)(1) through (6) of this section for review and evaluation by the State beginning June 8, 2004.</p>	<p><i>included 36.2(b) & 36.4.2d</i></p> <p>The supplier must collect all of the following information about the recycle flow(s):</p>	<p>D/04</p>	9.3(a)

141.76(d)	Recordkeeping. The system must collect and retain on file recycle flow information specified in paragraphs (d)(1) through (6) of this section for review and evaluation by the State beginning June 8, 2004.	Upon request by the Department, the supplier must submit copies of any records required to be maintained or any documents in existence, which the Department is entitled to inspect pursuant to the Colorado Primary Drinking Water Regulations.	D104 36.2(b)
141.76(d)	Recordkeeping. The system must collect and retain on file recycle flow information specified in paragraphs (d)(1) through (6) of this section for review and evaluation by the State beginning June 8, 2004.	The supplier must maintain the following recycle flow information:	D017 36.4.2(d)
141.76(d)(1)	Copy of the recycle notification and information submitted to the State under paragraph (b) of this section.	A copy of the recycle notification and information submitted to the Department under 9.4)	ND 36.4.2(d)(1)
141.76(d)(2)	List of all recycle flows and the frequency with which they are returned.	A list of all recycle flows and the frequency with which they are returned.	ND 9.3(a)(1)
141.76(d)(2)	List of all recycle flows and the frequency with which they are returned.	A list of all recycle flows and the frequency with which they are returned.	ND 36.4.2(d)(2)
141.76(d)(3)	Average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes.	The average and maximum backwash flow rate through the filters:	ND 9.3(a)(2)
141.76(d)(3)	Average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes.	The average and maximum duration of the filter backwash process in minutes.	ND 9.3(a)(3)
141.76(d)(3)	Average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes.	The average and maximum backwash flow rate through the filters and the average and maximum duration of the filter backwash process in minutes.	ND 36.4.2(d)(3)
141.76(d)(4)	Typical filter run length and a written summary of how filter run length is determined.	The typical filter run length and a written summary of how filter run length is determined.	ND 9.3(a)(4)
141.76(d)(4)	Typical filter run length and a written summary of how filter run length is determined.	The typical filter run length and a written summary of how filter run length is determined.	ND 36.4.2(d)(4)
141.76(d)(5)	The type of treatment provided for the recycle flow.	The type of treatment provided for the recycle flow(s).	ND 9.3(a)(5)
141.76(d)(5)	The type of treatment provided for the recycle flow.	The type of treatment provided for the recycle flow.	ND 36.4.2(d)(5)

141.76(d)(6)	Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used and average dose and frequency of use, and frequency at which solids are removed, if applicable.	If applicable, data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used, including the average dose and frequency of use, and frequency at which solids are removed.	D104
141.76(d)(6)	Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used and average dose and frequency of use, and frequency at which solids are removed, if applicable.	Data on the physical dimensions of the equalization and/or treatment units, typical and maximum hydraulic loading rates, type of treatment chemicals used and average dose and frequency of use, and frequency at which solids are removed, if applicable.	D104
141.80(a)	Applicability and effective dates		36.4.2(d)(6)
141.80(a)(1)	The requirements of this subpart I constitute the national primary drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of this subpart applies to community water systems and non-transient, non-community water systems (hereinafter referred to as "water systems" or "systems").	For all community and non-transient, non-community water systems, the supplier must comply with the requirements specified in this article.	D104
141.80(a)(2)	[Reserved]		26.1(a)
141.80(a)(2)	A small system (serving =3300 persons) and a medium-size system (serving >3,300 and =50,000 persons) shall complete the corrosion control treatment steps specified in paragraph (e) of this section, unless it is deemed to have optimized corrosion control under paragraph (b)(1), (b)(2), or (b)(3) of this section.	correct Fed cite	26.1(a)
141.80(b)	Scope. These regulations establish a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumers' taps.	For all community and non-transient, non-community water systems, the supplier must comply with the requirements specified in this article.	D104
141.80(b)			26.1(a)

81 (307A)

1 (68R)

141.170(a)	<p>The requirements of this subpart P constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The requirements of this subpart are applicable to subpart H systems serving at least 10,000 people, beginning January 1, 2002 unless otherwise specified in this subpart. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: Giardia lamblia, viruses, heterotrophic plate count bacteria, Legionella, Cryptosporidium, and turbidity. Each subpart H system serving at least 10,000 people must provide treatment of its source water that complies with these treatment technique requirements and are in addition to those identified in §141.70. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:</p>	<p><i>Dates have all in #1 passed all in #1</i> <i>8.1.1</i> <i>see comment</i></p> <p>For all surface water systems, the supplier must comply with the requirements specified in this article.</p>	<p><i>C48</i></p> <p>8.1.1(a)</p>
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141.170(a)	<p>The requirements of this subpart P constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The requirements of this subpart are applicable to subpart H systems serving at least 10,000 people, beginning January 1, 2002 unless otherwise specified in this subpart. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: <i>Giardia lamblia</i>, viruses, heterotrophic plate count bacteria, <i>Legionella</i>, <i>Cryptosporidium</i>, and turbidity. Each subpart H system serving at least 10,000 people must provide treatment of its source water that complies with these treatment technique requirements and are in addition to those identified in §141.70. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:</p>	<p>The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: <i>Cryptosporidium</i>, <i>Giardia lamblia</i>, viruses, Heterotrophic Plate Count bacteria, <i>Legionella</i>, and turbidity. These treatment techniques are as follows:</p>	<p>C48</p> <p>8.1.2(a)</p>
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	<p>The requirements of this subpart P constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The requirements of this subpart are applicable to subpart H systems serving at least 10,000 people, beginning January 1, 2002 unless otherwise specified in this subpart. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: Giardia lamblia, viruses, heterotrophic plate count bacteria, Legionella, Cryptosporidium, and turbidity. Each subpart H system serving at least 10,000 people must provide treatment of its source water that complies with these treatment technique requirements and are in addition to those identified in §141.70. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:</p>		CL48
141.170(a)	<p>At least 99 percent (2-log) removal of Cryptosporidium between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or Cryptosporidium control under the watershed control plan for unfiltered systems.</p>	<p>At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:</p>	8.1.2(a)(1)
141.170(a)(1)	<p>NO DISCUSSION IN THE GENERAL SECTION IN APPLICABILITY</p>	<p>99 percent (2-log) removal of Cryptosporidium.</p>	8.1.2(a)(1)(i)
141.170(a)(2)	<p>Compliance with the profiling and benchmark requirements under the provisions of §141.172.</p>	<p>The supplier must comply with the treatment technique requirement to develop a disinfection profile to determine log inactivation of Giardia lamblia if the system meets either of the following criteria:</p>	8.4.1(a)(2)

141.170(a)(2)	Compliance with the profiling and benchmark requirements under the provisions of §141.172.	A system supplying greater than or equal to (=) 10,000 people and has a TTHM annual average of quarterly samples greater than or equal to (=) 0.064 mg/L or has an HAA5 annual average of quarterly samples greater than or equal to (=) 0.048 mg/L.	P/04 8.4.1(a)(2)(i)
141.170(a)(2)	Compliance with the profiling and benchmark requirements under the provisions of §141.172.	If the supplier fails to comply with the requirements specified in this section, 8.4, a disinfection profiling treatment technique violation occurs.	P/04 8.4.4(a)
141.170(a)(2)	Compliance with the profiling and benchmark requirements under the provisions of §141.172.	If the supplier fails to comply with the requirements specified in this section, 8.5, a disinfection benchmarking treatment technique violation occurs.	P/04 8.5.4(a)
141.170(b)	A public water system subject to the requirements of this subpart is considered to be in compliance with the requirements of paragraph (a) of this section if: It meets the requirements for avoiding filtration in §§141.71 and 141.171 and the disinfection requirements in §§141.72 and 141.172; or	The supplier is considered to be in compliance with the requirements specified in 8.1.2(a), if the supplier meets all of the following: <i>not stringent</i>	W/A 8.1.2(b)
141.170(b)(1)	It meets the applicable filtration requirements in either §141.73 or §141.173 and the disinfection requirements in §§141.72 and 141.172.	See comment C5	C50 8.1.2(b)(1)
141.170(b)(2)	It meets the applicable filtration requirements in either §141.73 or §141.173 and the disinfection requirements in §§141.72 and 141.172.	The disinfection requirements specified in 8.3.2.	C50 8.1.2(b)(2)
141.170(c)	Systems are not permitted to begin construction of uncovered finished water storage facilities beginning February 16, 1999. <i>data has passed</i>	The supplier must not use uncovered finished water storage facilities.	D/04 8.1.2(c)

	Subpart H systems that did not conduct optional monitoring under §141.172 because they served fewer than 10,000 persons when such monitoring was required, but serve more than 10,000 persons prior to January 1, 2005 must comply with §§141.170, 141.171, 141.173, 141.174, and 141.175. These systems must also consult with the State to establish a disinfection benchmark. A system that decides to make a significant change to its disinfection practice, as described in §141.172(c)(1)(i) through (iv) must consult with the State prior to making such change.	<i>Dates have passed</i> A system supplying greater than or equal to (=) 10,000 people and has a TTHM annual average of quarterly samples greater than or equal to (=) 0.064 mg/L or has an HAA5 annual average of quarterly samples greater than or equal to (=) 0.048 mg/L.	<i>N/A</i>
141.170(d)	Subpart H systems that did not conduct optional monitoring under §141.172 because they served fewer than 10,000 persons when such monitoring was required, but serve more than 10,000 persons prior to January 1, 2005 must comply with §§141.170, 141.171, 141.173, 141.174, and 141.175. These systems must also consult with the State to establish a disinfection benchmark. A system that decides to make a significant change to its disinfection practice, as described in §141.172(c)(1)(i) through (iv) must consult with the State prior to making such change.		<i>N/A</i>
141.170(d)	Consult with the Department.		8.5.1(a)(2)
141.171	In addition to the requirements of §141.71, a public water system subject to the requirements of this subpart that does not provide filtration must meet all of the conditions of paragraphs (a) and (b) of this section.	<i>more stringent state-must Filter</i>	<i>N/A</i>
141.171(a)	Site-specific conditions. In addition to site-specific conditions in §141.71(b), systems must maintain the watershed control program under §141.71(b)(2) to minimize the potential for contamination by <i>Cryptosporidium</i> oocysts in the source water. The watershed control program must, for <i>Cryptosporidium</i> :	<i>''</i>	<i>N/A</i>

	Identify watershed characteristics and activities which may have an adverse effect on source water quality; and		N/A
141.171(a)(1)	Monitor the occurrence of activities which may have an adverse effect on source water quality.	"	N/A
141.171(a)(2)	During the onsite inspection conducted under the provisions of §141.71(b)(3), the State must determine whether the watershed control program established under §141.71(b)(2) is adequate to limit potential contamination by <i>Cryptosporidium</i> oocysts. The adequacy of the program must be based on the comprehensiveness of the watershed review; the effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed; and the extent to which the water system has maximized land ownership and/or controlled land use within the watershed.	"	N/A
141.171(b)	Determination of systems required to profile. A public water system subject to the requirements of this subpart must determine its TTHM annual average using the procedure in paragraph (a)(1) of this section and its HAA5 annual average using the procedure in paragraph (a)(2) of this section. The annual average is the arithmetic average of the quarterly averages of four consecutive quarters of monitoring.	Dates have passed	N/A
141.172(a)	The TTHM annual average must be the annual average during the same period as is used for the HAA5 annual average.	"	N/A
141.172(a)(1)	Those systems that collected data under the provisions of subpart M (Information Collection Rule) must use the results of the samples collected during the last four quarters of required monitoring under §141.142.	"	N/A
141.172(a)(1)(i)			

	Those systems that use "grandfathered" HAA5 occurrence data that meet the provisions of paragraph (a)(2)(ii) of this section must use TTHM data collected at the same time under the provisions of §§141.12 and 141.30.		N/A
141.172(a)(1)(ii)	Those systems that use HAA5 occurrence data that meet the provisions of paragraph (a)(2)(iii)(A) of this section must use TTHM data collected at the same time under the provisions of §§141.12 and 141.30.		N/A
141.172(a)(1)(iii)	The HAA5 annual average must be the annual average during the same period as is used for the TTHM annual average.		N/A
141.172(a)(2)	Those systems that collected data under the provisions of subpart M (Information Collection Rule) must use the results of the samples collected during the last four quarters of required monitoring under §141.142.		N/A
141.172(a)(2)(i)	Those systems that have collected four quarters of HAA5 occurrence data that meets the routine monitoring sample number and location requirements for TTHM in §§141.12 and 141.30 and handling and analytical method requirements of §141.142(b)(1) may use those data to determine whether the requirements of this section apply.		N/A
141.172(a)(2)(ii)	Those systems that have not collected four quarters of HAA5 occurrence data that meets the provisions of either paragraph (a)(2)(i) or (ii) of this section by March 16, 1999 must either:		N/A
141.172(a)(2)(iii)			

141.172(a)(2)(iii)(A)	Conduct monitoring for HAA5 that meets the routine monitoring sample number and location requirements for TTHM in §141.12 and 141.30 and handling and analytical method requirements of §141.142(b)(1) to determine the HAA5 annual average and whether the requirements of paragraph (b) of this section apply. This monitoring must be completed so that the applicability determination can be made no later than March 31, 2000, or	For new surface water systems or reclassified systems that now meet the applicability of this article, applicability for this section, 8.4, is determined by evaluating TTHM and HAA5 sample results. Applicability must be determined no later than 12 months after the system is classified as a surface water system.	8.4.1(a)
141.172(a)(2)(iii)(B)	Comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with paragraph (b) of this section.		8.4
141.172(a)(3)	The system may request that the State approve a more representative annual data set than the data set determined under paragraph (a)(1) or (2) of this section for the purpose of determining applicability of the requirements of this section.		8.4
141.172(a)(4)	The State may require that a system use a more representative annual data set than the data set determined under paragraph (a)(1) or (2) of this section for the purpose of determining applicability of the requirements of this section.		8.4
141.172(a)(5)	The system must submit data to the State on the schedule in paragraphs (a)(5)(i) through (v) of this section.		8.4
141.172(a)(5)(i)	Those systems that collected TTHM and HAA5 data under the provisions of subpart M (Information Collection Rule), as required by paragraphs (a)(1)(i) and (a)(2)(i) of this section, must submit the results of the samples collected during the last 12 months of required monitoring under §141.142 not later than December 31, 1999.		8.4

141.172(a)(5)(iii)	Those systems that have collected four consecutive quarters of HAA5 occurrence data that meets the routine monitoring sample number and location for TTHM in §§141.12 and 141.30 and handling and analytical method requirements of §141.142(b)(1), as allowed by paragraphs (a)(1)(ii) and (a)(2)(ii) of this section, must submit those data to the State not later than April 16, 1999. Until the State has approved the data, the system must conduct monitoring for HAA5 using the monitoring requirements specified under paragraph (a)(2)(iii) of this section.		
141.172(a)(5)(iii)	Those systems that conduct monitoring for HAA5 using the monitoring requirements specified by paragraphs (a)(1)(iii) and (a)(2)(iii)(A) of this section, must submit TTHM and HAA5 data not later than March 31, 2000.		~1A
141.172(a)(5)(iv)	Those systems that elect to comply with all other provisions of this section as if the HAA5 monitoring had been conducted and the results required compliance with this section, as allowed under paragraphs (a)(2)(iii)(B) of this section, must notify the State in writing of their election not later than December 31, 1999.	Choose not to collect the TTHM and HAA5 data, if the supplier notifies the Department of the decision. The supplier must therefore develop a disinfection profile to determine log inactivation of Giardia lamblia under 8.4.1(a)(2).	~1A 8.4.1(a)(1)(ii)
141.172(a)(5)(v)	If the system elects to request that the State approve a more representative annual data set than the data set determined under paragraph (a)(2)(i) of this section, the system must submit this request in writing not later than December 31, 1999.	The supplier must collect TTHM and HAA5 samples that meet the routine sampling requirements specified in 25.1.3 and submit the results to the Department. Alternatively, the supplier may:	~1A 8.4.1(a)(1)
141.172(a)(5)(v)	If the system elects to request that the State approve a more representative annual data set than the data set determined under paragraph (a)(2)(i) of this section, the system must submit this request in writing not later than December 31, 1999.		~1A
141.172(a)(5)(v)	Request that the Department approve the use of a more appropriate data set for determination of applicability; or		8.4.1(a)(1)(i)

	Any system having either a TTHM annual average = 0.064 mg/L or an HAA5 annual average = 0.048 mg/L during the period identified in paragraphs (a)(1) and (2) of this section must comply with paragraph (b) of this section.	A system <u>supplying greater than or equal to (=) 10,000</u> people and has a TTHM annual average of quarterly samples greater than or equal to (=) 0.064 mg/L or has an HAA5 annual average of quarterly samples greater than or equal to (=) 0.048 mg/L.	b/04 8.4.1(a)(2)(i) 8.4
141.172(a)(6)	Disinfection profiling	Disinfection Profiling	ND 8.4
141.172(b)(1)	Any system that meets the criteria in paragraph (a)(6) of this section must develop a <u>disinfection profile of its disinfection practice for a period of up to three years.</u>	<i>crosswalk should ref 8.4.1</i> <i>not included</i>	CS/LS CS2
141.172(b)(2)	The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of §141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section. A system with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in §141.74(a), as follows:	<i>not included</i> <i>Does not ref</i> The supplier must comply with the treatment technique requirement to develop a disinfection profile to determine log inactivation of Giardia lamblia if the system meets either of the following criteria:	8.4.1(a)(2)

	<p>The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of §141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section. A system with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in §141.74(a), as follows:</p>		C52
141.172(b)(2)	<p>The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of §141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section. A system with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in §141.74(a), as follows:</p>	<p>To determine the log inactivation ratio(s) for each disinfection segment before the distribution system, the supplier must monitor the following set of parameters during daily peak hourly flow:</p>	8.4.2(a)
141.172(b)(2)	<p>The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of §141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section. A system with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in §141.74(a), as follows:</p>	<p>The supplier must monitor the set of parameters specified in 8.4.2(a) at the following frequencies:</p>	C52 8.4.2(b)

	<p>The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of §141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section. A system with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in §141.74(a), as follows:</p>	C52
141.172(b)(2)	<p>The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of §141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section. A system with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in §141.74(a), as follows:</p>	<p>For systems meeting the criteria as specified in 8.4.1(a)(2)(i), at least daily for 12 consecutive months.</p> <p>8.4.2(b)(1)</p>
141.172(b)(2)	<p>For seasonal systems, at the frequency specified above in 8.4.2(b)(1) or 8.4.2(b)(2) only when the system operates.</p>	<p>8.4.2(b)(3)</p>

	<p>The system must monitor daily for a period of 12 consecutive calendar months to determine the total logs of inactivation for each day of operation, based on the CT99.9 values in Tables 1.1-1.6, 2.1, and 3.1 of §141.74(b), as appropriate, through the entire treatment plant. This system must begin this monitoring not later than April 1, 2000. As a minimum, the system with a single point of disinfectant application prior to entrance to the distribution system must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section. A system with more than one point of disinfectant application must conduct the monitoring in paragraphs (b)(2)(i) through (iv) of this section for each disinfection segment. The system must monitor the parameters necessary to determine the total inactivation ratio, using analytical methods in §141.74(a), as follows:</p>	<p>For each set of parameters collected under 8.4.2, the supplier must calculate total inactivation ratio(s) and total logs of inactivation for Giardia lamblia based on the CT99.9 values in Article 10 as follows:</p>	CS2
141.172(b)(2)		<p>not included</p>	8.4.3(a)
141.172(b)(2)(i)	<p>The temperature of the disinfected water must be measured once per day at each residual disinfectant concentration sampling point during peak hourly flow.</p>	<p>not included in currently 8.4.2(a)</p>	CS3
141.172(b)(2)(i)	<p>If the system uses chlorine, the pH of the disinfected water must be measured once per day at each chlorine residual disinfectant concentration sampling point during peak hourly flow.</p>	<p>For systems using chlorine, the pH of the disinfected water at each residual disinfectant concentration sampling location or at an alternative Department-approved location(s).</p>	CS4 8.4.2(a)(2)
141.172(b)(2)(ii)	<p>The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow.</p>	<p>System-specific parameters to determine the disinfectant contact time(s) (T).</p>	CS5 8.4.2(a)(3)
141.172(b)(2)(iii)	<p>The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection must be measured each day during peak hourly flow.</p>	<p>not included</p>	CS6 8.4.2(a)(4)
141.172(b)(2)(iv)		<p>The residual disinfectant concentration(s) (C) at each entry point.</p>	CS7 8.4.2(a)(1)

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	<p>In lieu of the monitoring conducted under the provisions of paragraph (b)(2) of this section to develop the disinfection profile, the system may elect to meet the requirements of paragraph (b)(3)(i) of this section. In addition to the monitoring conducted under the provisions of paragraph (b)(2) of this section to develop the disinfection profile, the system may elect to meet the requirements of paragraph (b)(3)(ii) of this section.</p>	<p><i>equivalent</i></p> <p><i>not referring to the same information</i></p> <p>For systems meeting the criteria specified in 8.4.1(b) the supplier is not required to conduct monitoring as specified in 8.4.2(a-b), if the system meets one of the following criteria:</p>	<p>C57 LS</p>
141.172(b)(3)(i)	<p>A PWS that has three years of existing operational data may submit those data, a profile generated using those data, and a request that the State approve use of those data in lieu of monitoring under the provisions of paragraph (b)(2) of this section not later than March 31, 2000. The State must determine whether these operational data are substantially equivalent to data collected under the provisions of paragraph (b)(2) of this section. These data must also be representative of Giardia lamblia inactivation through the entire treatment plant and not just of certain treatment segments. Until the State approves this request, the system is required to conduct monitoring under the provisions of paragraph (b)(2) of this section.</p>	<p><i>does not include Fed 141.172(a) which is a change from 8.4.1(a) b2 to 264 ppb or state trigger for 100 ppb or 100 ppb</i></p> <p>If the supplier has made a significant change to treatment practices or changed sources since the data was collected, the supplier must not use previously collected data.</p>	<p>C58 LS?</p> <p>8.4.2(c)(1)(i)</p>

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	In addition to the disinfection profile generated under paragraph (b)(2) of this section, a PWS that has existing operational data may use those data to develop a disinfection profile for additional years. Such systems may use these additional yearly disinfection profiles to develop a benchmark under the provisions of paragraph (c) of this section. The State must determine whether these operational data are substantially equivalent to data collected under the provisions of paragraph (b)(2) of this section. These data must also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.	Same as Above	C59 L52
141.172(b)(3)(iii)	In addition to the disinfection profile generated under paragraph (b)(2) of this section, a PWS that has existing operational data may use those data to develop a disinfection profile for additional years. Such systems may use these additional yearly disinfection profiles to develop a benchmark under the provisions of paragraph (c) of this section. The State must determine whether these operational data are substantially equivalent to data collected under the provisions of paragraph (b)(2) of this section. These data must also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.	If the supplier has made a significant change to treatment practices or changed sources since the data was collected, the supplier must not use previously collected data.	8.4.2(c)(1)(i)
141.172(b)(3)(ii)	In addition to the disinfection profile generated under paragraph (b)(2) of this section, a PWS that has existing operational data may use those data to develop a disinfection profile for additional years. Such systems may use these additional yearly disinfection profiles to develop a benchmark under the provisions of paragraph (c) of this section. The State must determine whether these operational data are substantially equivalent to data collected under the provisions of paragraph (b)(2) of this section. These data must also be representative of inactivation through the entire treatment plant and not just of certain treatment segments.	not included	C60 L52
141.172(b)(4)	The system must calculate the total inactivation ratio as follows:	For each set of parameters collected under 8.4.2, the supplier must calculate total inactivation ratio(s) and total logs of inactivation for Giardia lamblia based on the CT99.9 values in Article 10 as follows:	D104 8.4.3(a)

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No CT values

141.172(b)(4)(i)	if the system uses only one point of disinfectant application the system may determine the total inactivation ratio for the disinfection segment based on either of the methods in paragraph (b)(4)(i)(A) or (b)(4)(i)(B) of this section.	includes both under (a)(1) but confuses language	C61 LS?
41.172(b)(4)(i)(A)	Determine one inactivation ratio (CTcalc/CT99.9) before or at the first customer during peak hourly flow.	does not include For a supplier monitoring at a single location, calculate one inactivation ratio.	C62 LS? 8.4.3(a)(1)(i)
41.172(b)(4)(i)(B)	Determine successive CTcalc/CT99.9 values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining (CTcalc/CT99.9) for each sequence and then adding the (CTcalc/CT99.9) values together to determine (S (CTcalc/CT99.9)).	For systems with one point of disinfectant application and multiple disinfection segments, the supplier must also monitor before each sequential segment of disinfection.	C63 LS?
41.172(b)(4)(i)(B)	Determine successive CTcalc/CT99.9 values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining (CTcalc/CT99.9) for each sequence and then adding the (CTcalc/CT99.9) values together to determine (S (CTcalc/CT99.9)).	not included	C63 LS?
41.172(b)(4)(i)(B)		For a supplier monitoring at multiple locations:	8.4.3(a)(1)(ii)

141.172(b)(4)(i)(B)	<p>Determine successive $CT_{calc}/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining $(CT_{calc}/CT_{99.9})$ for each sequence and then adding the $(CT_{calc}/CT_{99.9})$ values together to determine $(S(CT_{calc}/CT_{99.9}))$.</p>	<p><i>not included</i></p> <p>Determine the inactivation ratio value for each segment.</p>	<p>C63 LS?</p> <p>8.4.3(a)(1)(iii)(A)</p>
141.172(b)(4)(i)(B)	<p>Determine successive $CT_{calc}/CT_{99.9}$ values, representing sequential inactivation ratios, between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the system must calculate the total inactivation ratio by determining $(CT_{calc}/CT_{99.9})$ for each sequence and then adding the $(CT_{calc}/CT_{99.9})$ values together to determine $(S(CT_{calc}/CT_{99.9}))$.</p>	<p>Add all inactivation ratio values to determine the total inactivation ratio: $(S(CT_{calc}/CT_{99.9}))$.</p>	<p>C63 LS?</p> <p>8.4.3(a)(1)(iii)(B)</p>
141.172(b)(4)(ii)	<p>If the system uses more than one point of disinfectant application before the first customer, the system must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The $(CT_{calc}/CT_{99.9})$ value of each segment and $(S(CT_{calc}/CT_{99.9}))$ must be calculated using the method in paragraph (b)(4)(i) of this section.</p>	<p><i>does not include</i></p> <p>For systems with multiple points of disinfectant application, the supplier must also monitor before each additional point of disinfectant application.</p>	<p>C64 LS?</p> <p>8.4.2(a)(1)(ii)</p>

	<p>If the system uses more than one point of disinfectant application before the first customer, the system must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The (CTcalc/CT99.9) value of each segment and (S(CTcalc/CT99.9)) must be calculated using the method in paragraph (b)(4)(i) of this section.</p>			<p>C64 LS?</p>
141.172(b)(4)(ii)	<p>If the system uses more than one point of disinfectant application before the first customer, the system must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The (CTcalc/CT99.9) value of each segment and (S(CTcalc/CT99.9)) must be calculated using the method in paragraph (b)(4)(i) of this section.</p>			<p>C64 LS?</p>
141.172(b)(4)(ii)	<p>If the system uses more than one point of disinfectant application before the first customer, the system must determine the CT value of each disinfection segment immediately prior to the next point of disinfectant application, or for the final segment, before or at the first customer, during peak hourly flow. The (CTcalc/CT99.9) value of each segment and (S(CTcalc/CT99.9)) must be calculated using the method in paragraph (b)(4)(i) of this section.</p>			<p>C64 LS?</p>
141.172(b)(4)(iii)	<p>The system must determine the total logs of inactivation by multiplying the value calculated in paragraph (b)(4)(i) or (ii) of this section by 3.0.</p>	<p>Add all inactivation ratio values to determine the total inactivation ratio: (S (CTcalc/CT99.9)).</p> <p>Does not include</p> <p>The supplier must determine the total logs of inactivation by multiplying the total inactivation ratio by 3.0. Total logs of inactivation is equal to: 3.0 x S (CTcalc/CT99.9).</p>		<p>C65 LS?</p>

141.172(b)(5)	A system that uses either chloramines or ozone for primary disinfection must also calculate the logs of inactivation for viruses using a method approved by the State.	For systems that use chloramines, ozone, or chlorine dioxide that meet the criteria specified in 8.4.1(a)(2), the supplier must also develop a disinfection profile to determine log inactivation of viruses.	D/04	8.4.1(a)(3)
141.172(b)(5)	A system that uses either chloramines or ozone for primary disinfection must also calculate the logs of inactivation for viruses using a method approved by the State.	If the supplier is required to calculate the logs of inactivation for viruses as specified in 8.4.1(a)(3) or 8.4.1(b), the supplier must use a Department-approved calculation method.	D/04	8.4.3(b)
141.172(b)(6)	The system must retain disinfection profile data in graphic form, as a spreadsheet, or in some other format acceptable to the State for review as part of sanitary surveys conducted by the State.	The supplier must maintain disinfection profile data in graphic form, as a spreadsheet, or in a Department-accepted format for review as part of sanitary surveys.	D/04	8.4.3(c)
141.172(c)	Disinfection benchmarking	Disinfection Profiling	D/04	8.4
141.172(c)	Disinfection benchmarking	Disinfection Benchmarking	LD	8.5
	Any system required to develop a disinfection profile under the provisions of paragraphs (a) and (b) of this section and that decides to make a significant change to its disinfection practice must consult with the State prior to making such change. Significant changes to disinfection practice are:	Significant changes in disinfection practice means one or more of the following: If the supplier was required to develop a disinfection profile for Giardia lamblia and/or viruses as specified in 8.4 and plans to make a significant change in disinfection practices, as defined in 8.4.1(d) the supplier must comply with all of the following treatment technique requirements before making the change:	D/04	8.5.1(a)
141.172(c)(1)	Any system required to develop a disinfection profile under the provisions of paragraphs (a) and (b) of this section and that decides to make a significant change to its disinfection practice must consult with the State prior to making such change. Significant changes to disinfection practice are:		D/04	8.5.1(a)(2)

141.172(c)(1)(i)	Changes to the point of disinfection;	Changes to the point of disinfection.	ND 8.4.1(d)(1)
141.172(c)(1)(ii)	Changes to the disinfectant(s) used in the treatment plant;	Changes to the disinfectant(s) used in the treatment plant.	ND 8.4.1(d)(2)
141.172(c)(1)(iii)	Changes to the disinfection process; and	Changes to the disinfection process.	ND 8.4.1(d)(3)
141.172(c)(1)(iv)	Any other modification identified by the State.	Any other modification identified by the Department.	ND 8.4.1(d)(4)
141.172(c)(2)	Any system that is modifying its disinfection practice must calculate its disinfection benchmark using the procedure specified in paragraphs (c)(2)(i) through (ii) of this section.	NOT the same Calculate a disinfection benchmark for each profile developed under 8.4.3.	C66 LS? 8.5.1(a)(1)
141.172(c)(2)(i)	For each year of profiling data collected and calculated under paragraph (b) of this section, the system must determine the lowest average monthly Giardia lamblia inactivation in each year of profiling data. The system must determine the average Giardia lamblia inactivation for each calendar month for each year of profiling data by dividing the sum of daily Giardia lamblia of inactivation by the number of values calculated for that month.	not included OK 8.5.1(a). Calculate the average log inactivation for each month using the total logs of inactivation value(s) calculated in the disinfection profile developed under 8.4.3.	C67 LS? 8.5.2(a)(1)
141.172(c)(2)(ii)	The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of Giardia lamblia inactivation in each year of profiling data.	OK Disinfection benchmark means the lowest monthly average of total log inactivation values calculated in the disinfection profile. The disinfection benchmark is used as a baseline of inactivation when considering changes in the disinfection process.	D104 8.5.1(b)
141.172(c)(2)(ii)	The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of Giardia lamblia inactivation in each year of profiling data.	→ IR 8.5.1(b) If the supplier has collected one year of data, the lowest monthly average log inactivation value is the disinfection benchmark.	D104 8.5.2(a)(2)

	The disinfection benchmark is the lowest monthly average value (for systems with one year of profiling data) or average of lowest monthly average values (for systems with more than one year of profiling data) of the monthly logs of Giardia lamblia inactivation in each year of profiling data.	If the supplier has collected more than one year of data, the average of the lowest monthly average log inactivation value for each calendar year is the disinfection benchmark.	D/04
141.172(c)(2)(ii)	A system that uses either chloramines or ozone for primary disinfection must also calculate the disinfection benchmark for viruses using a method approved by the State.	not included	C68 LS?
141.172(c)(3)	A system that uses either chloramines or ozone for primary disinfection must also calculate the disinfection benchmark for viruses using a method approved by the State.	The supplier must calculate a disinfection benchmark as follows:	8.5.1(a)(1)
141.172(c)(3)	The system must submit information in paragraphs (c)(4)(i) through (iii) of this section to the State as part of its consultation process.	The supplier must submit all of the following information as part of the consultation process:	C68 LS?
141.172(c)(4)	A description of the proposed change: <i>Does not include any change per 141.172 C 1 iv</i>	A description of the proposed change in disinfection practice.	D/04 C69 LS 8.5.3(a)(1)
141.172(c)(4)(i)	The disinfection profile for Giardia lamblia (and, if necessary, viruses) under paragraph (b) of this section and benchmark as required by paragraph (c)(2) of this section; and	The disinfection profile and benchmark for Giardia lamblia.	C70 LS? 8.5.3(a)(2)
141.172(c)(4)(ii)	The disinfection profile for Giardia lamblia (and, if necessary, viruses) under paragraph (b) of this section and benchmark as required by paragraph (c)(2) of this section; and	If required to be developed, the disinfection profile and benchmark for viruses.	C70 LS? 8.5.3(a)(3)
141.172(c)(4)(iii)	An analysis of how the proposed change will affect the current levels of disinfection.	An analysis of how the proposed change will affect the current levels of disinfection.	ND 8.5.3(a)(4)

	A public water system subject to the requirements of this subpart that does not meet all of the criteria in this subpart and subpart H of this part for avoiding filtration must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a) or (b) of this section or 141.173 §141.73 (b) or (c) by December 31, 2001.	The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows:	C71
141.173	A public water system subject to the requirements of this subpart that does not meet all of the criteria in this subpart and subpart H of this part for avoiding filtration must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a) or (b) of this section or 141.173 §141.73 (b) or (c) by December 31, 2001.	<i>Crosswalk needs to ref 8.1.2 b also see comments in Surfr</i>	C71
	A public water system subject to the requirements of this subpart that does not meet all of the criteria in this subpart and subpart H of this part for avoiding filtration must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a) or (b) of this section or 141.173 §141.73 (b) or (c) by December 31, 2001.	Filtration Requirements	8.2
141.173	A public water system subject to the requirements of this subpart that does not meet all of the criteria in this subpart and subpart H of this part for avoiding filtration must provide treatment consisting of both disinfection, as specified in §141.72(b), and filtration treatment which complies with the requirements of paragraph (a) or (b) of this section or 141.173 §141.73 (b) or (c) by December 31, 2001.	For all surface water systems, the supplier must comply with the requirements specified in this section, 8.2.	C71
141.173(a)	Conventional filtration treatment or direct filtration	At the combined filter effluent, the supplier must:	8.2.1(a) C72 8.2.2(a)(1)
141.173(a)(1)	For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74(a) and (c).	<i>not included</i> Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month.	C73 LS? 8.2.2(a)(1)(i)

141.173(a)(1)	For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74(a) and (c).	W/A The following constitute combined filter effluent treatment technique violations:	C73 LS? 8.2.4(a)
141.173(a)(1)	For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month, measured as specified in §141.74(a) and (c).	W/A More than 5 percent of turbidity monitoring results in any month are greater than (>) the applicable 95th percentile limits specified in Table 8-1.	C73 LS? 8.2.4(a)(1)
141.173(a)(2)	The turbidity level of representative samples of a system's filtered water must at no time exceed 1 NTU, measured as specified in §141.74(a) and (c). <i>not included</i>	Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.	C74 LS? 8.2.2(a)(1)(ii)
141.173(a)(2)	The turbidity level of representative samples of a system's filtered water must at no time exceed 1 NTU, measured as specified in §141.74(a) and (c).	The following constitute combined filter effluent treatment technique violations:	C74 LS? 8.2.4(a)
141.173(a)(2)	The turbidity level of representative samples of a system's filtered water must at no time exceed 1 NTU, measured as specified in §141.74(a) and (c).	At any time a turbidity monitoring result is greater than (>) the applicable maximum turbidity limit specified in Table 8-1.	C74 LS? 8.2.4(a)(2)
141.173(a)(3)	A system that uses lime softening may acidify representative samples prior to analysis using a protocol approved by the State.	For systems using lime softening, the supplier may acidify turbidity samples before analysis using a Department-approved protocol.	D104 8.2.3(b)
141.173(a)(3)	A system that uses lime softening may acidify representative samples prior to analysis using a protocol approved by the State.	For systems using lime softening, the supplier may acidify turbidity samples before analysis using a Department-approved protocol.	D104 8.2.7(a)(5)

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141.173(b)	<p>Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (a) of this section or in §141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts.</p>		<p>D/04</p> <p>8.2.2(a)(1)</p>
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	<p>Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (a) of this section or in §141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts.</p>	<p>OH</p> <p>Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month.</p>	<p>D164</p> <p>8.2.2(a)(1)(i)</p>
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141.173(b)	<p>Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (a) of this section or in §141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts.</p>	<p>Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.</p>	<p>D/04 8.2.2(a)(1)(ii)</p>
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141.173(b)	<p>Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (a) of this section or in §141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts.</p>	<p>if approved by the Department, the supplier may use alternative filtration technologies including membrane filtration or filtration technologies other than those specified in Table 8-1.</p>	<p>D/OK 8.2.2(b)</p>
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141.173(b)	<p>filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (a) of this section or in §141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of <i>Giardia lamblia</i> cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of <i>Cryptosporidium</i> oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of <i>Giardia lamblia</i> cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of <i>Cryptosporidium</i> oocysts.</p>	<p>OK</p> <p>In order for the Department to approve an alternative filtration technology, the supplier must demonstrate, using pilot plant studies or other means, that the filtration technology, in combination with the disinfection treatment as specified in 8.3.2 consistently achieves 99 percent (2-log) removal of <i>Cryptosporidium</i>, 99.9 percent (3-log) removal and inactivation of <i>Giardia lamblia</i>, 99.99 percent (4-log) removal and inactivation of viruses.</p>	<p>D/10/1</p> <p>8.2.2(b)(1)</p>
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<p>141.173(b)</p>	<p>Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (a) of this section or in §141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of <i>Giardia lamblia</i> cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of <i>Cryptosporidium</i> oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of <i>Giardia lamblia</i> cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of <i>Cryptosporidium</i> oocysts.</p>	<p>If the Department approves the use of an alternative filtration technology, the Department shall approve combined filter effluent turbidity limits which are no greater than:</p>	<p>D/OK</p> <p>8.2.2(b)(2)</p>
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	<p>Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (a) of this section or in §141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts.</p>	<p>1 NTU in 95 percent of measurements collected each month; and</p> <p>OK</p>	<p>12/04</p> <p>8.2.2(b)(2)(i)</p>
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	Filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration. A public water system may use a filtration technology not listed in paragraph (a) of this section or in §141.73(b) or (c) if it demonstrates to the State, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of §141.72(b), consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts, and the State approves the use of the filtration technology. For each approval, the State will set turbidity performance requirements that the system must meet at least 95 percent of the time and that the system may not exceed at any time at a level that consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts, 99.99 percent removal and/or inactivation of viruses, and 99 percent removal of Cryptosporidium oocysts.		D/04
141.173(b)		5 NTU at any time. 04	8.2.2(b)(2)(iii)
141.174		Monitoring Requirements for Combined Filter Effluent Treatment Technique Requirements	N/A 8.2.3
141.174		Monitoring Requirements for Individual Filter Effluent Turbidity	ND 8.2.7

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141.174(a)	Monitoring requirements for systems using filtration treatment. In addition to monitoring required by §141.74, a public water system subject to the requirements of this subpart that provides conventional filtration treatment or direct filtration must conduct continuous monitoring of turbidity for each individual filter using an approved method in §141.74(a) and must calibrate turbidimeters using the procedure specified by the manufacturer. Systems must record the results of individual filter monitoring every 15 minutes.	<p><i>different refs not included</i></p> <p><i>OH</i></p> <p>For systems using conventional filtration treatment or direct filtration, the supplier must monitor turbidity continuously at locations representative of each individual filter effluent.</p>	C75 LS?	8.2.7(a)
141.174(a)	Monitoring requirements for systems using filtration treatment. In addition to monitoring required by §141.74, a public water system subject to the requirements of this subpart that provides conventional filtration treatment or direct filtration must conduct continuous monitoring of turbidity for each individual filter using an approved method in §141.74(a) and must calibrate turbidimeters using the procedure specified by the manufacturer. Systems must record the results of individual filter monitoring every 15 minutes.	The supplier must record the individual filter effluent turbidity monitoring results at least every 15 minutes.	C75 LS?	8.2.7(a)(1)
141.174(a)	Monitoring requirements for systems using filtration treatment. In addition to monitoring required by §141.74, a public water system subject to the requirements of this subpart that provides conventional filtration treatment or direct filtration must conduct continuous monitoring of turbidity for each individual filter using an approved method in §141.74(a) and must calibrate turbidimeters using the procedure specified by the manufacturer. Systems must record the results of individual filter monitoring every 15 minutes.	The supplier must calibrate the continuous monitoring equipment using the manufacturer-specified procedure.	C75 LS?	8.2.7(a)(2)

	<p>If there is a failure in the continuous turbidity monitoring equipment, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.</p>	<p>If there is a failure of the continuous monitoring equipment, the supplier must monitor the individual filter effluent turbidity by collecting a grab sample no later than four hours after the last recorded monitoring result and continue collecting grab samples every four hours until the continuous monitoring equipment is returned to service.</p>	<p>D104</p> <p>8.2.7(a)(3)</p>
141.174(b)	<p>If there is a failure in the continuous turbidity monitoring equipment, the system must conduct grab sampling every four hours in lieu of continuous monitoring, but for no more than five working days following the failure of the equipment.</p>	<p>For systems supplying greater than or equal to (=) 10,000 people, the supplier must resume continuous individual filter effluent turbidity monitoring no later than five working days after the equipment failure.</p>	<p>D104</p> <p>8.2.7(a)(3)(i)</p>
141.175	<p>In addition to the reporting and recordkeeping requirements in §141.75, a public water system subject to the requirements of this subpart that provides conventional filtration treatment or direct filtration must report monthly to the State the information specified in paragraphs (a) and (b) of this section beginning January 1, 2002. In addition to the reporting and recordkeeping requirements in §141.75, a public water system subject to the requirements of this subpart that provides filtration approved under §141.173(b) must report monthly to the State the information specified in paragraph (a) of this section beginning January 1, 2002. The reporting in paragraph (a) of this section is in lieu of the reporting specified in §141.75(b)(1).</p>	<p>past dates</p> <p>Reporting Requirements for Combined Filter Effluent Monitoring</p>	<p>D104</p> <p>8.2.6</p>

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	<p>In addition to the reporting and recordkeeping requirements in §141.75, a public water system subject to the requirements of this subpart that provides conventional filtration treatment or direct filtration must report monthly to the State the information specified in paragraphs (a) and (b) of this section beginning January 1, 2002. In addition to the reporting and recordkeeping requirements in §141.75, a public water system subject to the requirements of this subpart that provides filtration approved under §141.173(b) must report monthly to the State the information specified in paragraph (a) of this section beginning January 1, 2002. The reporting in paragraph (a) of this section is in lieu of the reporting specified in §141.75(b)(1).</p>	Reporting Requirements for Individual Filter Effluent Turbidity Monitoring	D104 8.2.8
141.175	<p>In addition to the reporting and recordkeeping requirements in §141.75, a public water system subject to the requirements of this subpart that provides conventional filtration treatment or direct filtration must report monthly to the State the information specified in paragraphs (a) and (b) of this section beginning January 1, 2002. In addition to the reporting and recordkeeping requirements in §141.75, a public water system subject to the requirements of this subpart that provides filtration approved under §141.173(b) must report monthly to the State the information specified in paragraph (a) of this section beginning January 1, 2002. The reporting in paragraph (a) of this section is in lieu of the reporting specified in §141.75(b)(1).</p>	<p>Reporting Requirements for Disinfection Monitoring</p> <p><i>not some</i></p> <p>For combined filter effluent turbidity monitoring results collected under 8.2.3, the supplier must submit the following information no later than the 10th of the following month:</p>	8.3.6
141.175(a)	<p>Turbidity measurements as required by §141.173 must be reported within 10 days after the end of each month the system serves water to the public. Information that must be reported includes:</p>	<p>For combined filter effluent turbidity monitoring results collected under 8.2.3, the supplier must submit the following information no later than the 10th of the following month:</p>	<p>8.2.6(a)</p> <p><i>276</i> <i>LS?</i></p>

141.175(a)(1)	The total number of filtered water turbidity measurements taken during the month.	Number of combined filter effluent turbidity monitoring results recorded during the month.	C77 LS? 8.2.6(a)(1)
141.175(a)(2)	The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in §141.173(a) or (b). <i>state flips</i>	turbidity monitoring results recorded during the month that were greater than (>) the turbidity limits specified in 8.2.2. <i>not included</i>	C78 LS? 8.2.6(a)(2)
141.175(a)(3)	The date and value of any turbidity measurements taken during the month which exceed 1 NTU for systems using conventional filtration treatment or direct filtration, or which exceed the maximum level set by the State under §141.173(b).	The date and value of any combined filter effluent turbidity monitoring results collected during the month, which were greater than (>) the maximum turbidity limit.	C79 LS? 8.2.6(a)(3)
141.175(b)	Systems must maintain the results of individual filter monitoring taken under §141.174 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under §141.174 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under §141.174 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in paragraphs (b)(1) through (4) of this section. Systems that use lime softening may apply to the State for alternative exceedance levels for the levels specified in paragraphs (b)(1) through (4) of this section if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.	For individual filter effluent turbidity monitoring, the supplier must submit documentation that the monitoring was conducted, no later than the 10th of the following month in which the monitoring was conducted. <i>see next pg</i>	C80 LS? 8.2.8(a)

141.175(b)	<p>Systems must maintain the results of individual filter monitoring taken under §141.174 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under §141.174 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under §141.174 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in paragraphs (b)(1) through (4) of this section. Systems that use lime softening may apply to the State for alternative exceedance levels for the levels specified in paragraphs (b)(1) through (4) of this section if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.</p>	<p>Response to Individual Filter Effluent Turbidity Monitoring Results for Systems Supplying Greater Than or Equal to (=) 10,000 People</p> <p><i>not included</i></p>	<p>8.2.9</p>
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141.175(b)	<p>Systems must maintain the results of individual filter monitoring taken under §141.174 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under §141.174 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under §141.174 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in paragraphs (b)(1) through (4) of this section. Systems that use lime softening may apply to the State for alternative exceedance levels for the levels specified in paragraphs (b)(1) through (4) of this section if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.</p>	<p>OK</p> <p>For systems using lime softening, the supplier may apply to the Department for higher individual filter effluent turbidity limits than the limits specified in this subsection, 8.2.9, if the supplier can demonstrate that higher individual filter effluent limits are due only to lime carryover and not degraded filter performance.</p>	<p>C80 LS?</p> <p>8.2.9(e)</p>
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141.175(b)	<p>Systems must maintain the results of individual filter monitoring taken under §141.174 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under §141.174 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under §141.174 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in paragraphs (b)(1) through (4) of this section. Systems that use lime softening may apply to the State for alternative exceedance levels for the levels specified in paragraphs (b)(1) through (4) of this section if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.</p>	The supplier must maintain all of the following information for at least three years:	<div>C80 LS?</div> <div>36.4.2(a)</div>
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	<p>Systems must maintain the results of individual filter monitoring taken under §141.174 for at least three years. Systems must report that they have conducted individual filter turbidity monitoring under §141.174 within 10 days after the end of each month the system serves water to the public. Systems must report individual filter turbidity measurement results taken under §141.174 within 10 days after the end of each month the system serves water to the public only if measurements demonstrate one or more of the conditions in paragraphs (b)(1) through (4) of this section. Systems that use lime softening may apply to the State for alternative exceedance levels for the levels specified in paragraphs (b)(1) through (4) of this section if they can demonstrate that higher turbidity levels in individual filters are due to lime carryover only and not due to degraded filter performance.</p>		<p>C80 LS?</p>
141.175(b)	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.</p>	<p>OH</p> <p>The results of individual filter monitoring collected under 8.2.7.</p>	<p>36.4.2(a)(1)</p>
141.175(b)(1)		<p>If the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 1.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs and the supplier must:</p>	<p>8.2.9(a)</p>

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D/04

	For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.		D/04
141.175(b)(1)	For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.	Produce a filter profile no later than seven days after the exceedance if the cause for the exceedance is not known.	8.2.9(a)(1)
141.175(b)(1)		Submit all of the following no later than the 10th of the month following the exceedance:	8.2.9(a)(2)

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	For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the <u>filter number</u> , the <u>turbidity measurement</u> , and the <u>date(s)</u> on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.		D/04
141.175(b)(1)	For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.	Which filter exceeded.	8.2.9(a)(2)(i)
141.175(b)(1)		Date of the exceedance.	D/04
			8.2.9(a)(2)(ii)

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	For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the <u>turbidity measurement</u> , and the date(s) on which the <u>exceedance occurred</u> . In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.		D104
141.175(b)(1)	For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.	The turbidity monitoring results which exceeded 1.0 NTU.	8.2.9(a)(2)(iii)
141.175(b)(1)		The <u>cause for the exceedance</u> or if the cause of the exceedance is not known, <u>documentation</u> that a filter profile was produced.	D104 8.2.9(a)(2)(iv)

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	<p>For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.</p>	<p>not included more stringent by not using continuous states can use intermittent operation to meet these standards</p> <p>When a filter is brought online, if after the first four hours of operation, the individual filter effluent turbidity monitoring results at that filter are greater than (>) 0.5 NTU in two consecutive readings collected 15 minutes apart, an exceedance occurs and the supplier must:</p>	<p>CS1 more stringent</p>
141.175(b)(2)	<p>For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.</p>	<p>Produce a filter profile no later than seven days after the exceedance if the cause for the exceedance is not known.</p>	<p>8.2.9(d)</p>
141.175(b)(2)	<p>obvious reason for the exceedance.</p>		<p>8.2.9(d)(1)</p>

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	<p>For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.</p>		<p>Submit all of the following no later than the 10th of the month following the exceedance:</p>	<p>8.2.9(d)(2)</p>
141.175(b)(2)	<p>For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.</p>	<p>Which filter exceeded.</p>		<p>8.2.9(d)(2)(i)</p>

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	<p>For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.</p>		C81
141.175(b)(2)	obvious reason for the exceedance.	Date of the exceedance.	8.2.9(d)(2)(ii)
	<p>For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.</p>		C81
141.175(b)(2)	obvious reason for the exceedance.	The turbidity monitoring results which exceeded 0.5 NTU.	8.2.9(d)(2)(iii)

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	<p>For any individual filter that has a measured turbidity level of greater than 0.5 NTU in two consecutive measurements taken 15 minutes apart at the end of the first four hours of continuous filter operation after the filter has been backwashed or otherwise taken offline, the system must report the filter number, the turbidity, and the date(s) on which the exceedance occurred. In addition, the system must either produce a filter profile for the filter within 7 days of the exceedance (if the system is not able to identify an obvious reason for the abnormal filter performance) and report that the profile has been produced or report the obvious reason for the exceedance.</p>	<p>The cause for the exceedance or if the cause of the exceedance is not known, documentation that a filter profile was produced.</p>	<p>C81</p> <p>8.2.9(d)(2)(iv)</p>
<p>141.175(b)(2)</p>	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.</p>	<p>If, in each month, for three consecutive months, the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 1.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs.</p>	<p>D104</p> <p>8.2.9(b)</p>
<p>141.175(b)(3)</p>			

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	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, <u>the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted.</u> The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the <u>applicability of corrections</u>; and preparation of a filter self-assessment report.</p>		D104
141.175(b)(3)	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a <u>self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted.</u> The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.</p>	<p>The supplier must conduct a <u>self-assessment of that filter no later than 14 days after the exceedance.</u></p>	8.2.9(b)(1)
141.175(b)(3)		<p>The self-assessment must include at least all of the following:</p>	8.2.9(b)(2)

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	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the <u>self-assessment</u> was conducted. The self assessment must consist of at least the following components: <u>assessment of filter performance</u>; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.</p>		b104
141.175(b)(3)	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.</p>	Assessment of filter performance.	8.2.9(b)(2)(i)
141.175(b)(3)		Development of a filter profile.	8.2.9(b)(2)(ii)

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	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; <u>identification and prioritization of factors limiting filter performance</u>; assessment of the applicability of corrections; and preparation of a filter self-assessment report.</p>		D/104
141.175(b)(3)	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; <u>assessment of the applicability of corrections</u>; and preparation of a filter self-assessment report.</p>	<p><u>identification and prioritization of factors limiting filter performance.</u></p>	8.2.9(b)(2)(iii)
141.175(b)(3)		<p>Assessment of the applicability of corrections.</p>	8.2.9(b)(2)(iv)

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	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.</p>		D/O/H
141.175(b)(3)	<p>For any individual filter that has a measured turbidity level of greater than 1.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of three consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must conduct a self-assessment of the filter within 14 days of the exceedance and report that the self-assessment was conducted. The self assessment must consist of at least the following components: assessment of filter performance; development of a filter profile; identification and prioritization of factors limiting filter performance; assessment of the applicability of corrections; and preparation of a filter self-assessment report.</p>	Preparation of a written self-assessment report.	8.2.9(b)(2)(v)
141.175(b)(3)	<p>In addition to the reporting requirements specified in 8.2.9(a)(2), the supplier must submit notification by the 10th of the month following the exceedance that the self-assessment was conducted.</p>		8.2.9(b)(3)

	For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance.	D/OH	
141.175(b)(4)	For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance.	If, in each month, for two consecutive months, the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 2.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs.	8.2.9(c)
141.175(b)(4)	For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance.	The supplier must comply with the reporting requirements specified in 8.2.9(a)(2).	8.2.9(c)(1)

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	For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance.		D104
141.175(b)(4)	For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance.	No later than 30 days after the exceedance occurs, the supplier must arrange for a CPE to be conducted by the Department or by a Department-approved third party.	8.2.9(c)(2)
141.175(b)(4)		No later than 90 days after the exceedance occurs, the supplier must submit the completed CPE report.	D104 8.2.9(c)(3)

	For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance.	No later than 60 days after the exceedance occurs, the supplier must arrange for a CPE to be conducted by the Department or by a Department-approved third party.	8.2.10(c)(1)
141.175(b)(4)	For any individual filter that has a measured turbidity level of greater than 2.0 NTU in two consecutive measurements taken 15 minutes apart at any time in each of two consecutive months, the system must report the filter number, the turbidity measurement, and the date(s) on which the exceedance occurred. In addition, the system must arrange for the conduct of a comprehensive performance evaluation by the State or a third party approved by the State no later than 30 days following the exceedance and have the evaluation completed and submitted to the State no later than 90 days following the exceedance.	No later than 120 days after the exceedance occurs, the supplier must submit the completed CPE report.	8.2.10(c)(2)
141.175(b)(4)	8.2.5 Response to Combined Filter Effluent IT Violations	In the event of a maximum combined filter effluent turbidity limit treatment technique violation, as specified in 8.2.4(a)(2), the supplier must consult with the Department as soon as possible but no later than 24 hours after the violation occurs.	8.2.5(b)
141.175(c)	Additional reporting requirements	The Department shall determine from the consultation whether Tier 1 or Tier 2 public notice is required to protect public health. The supplier must distribute public notice as specified by the Department.	8.2.5(b)(1)
141.175(c)	Additional reporting requirements		8.2.5(b)(1)

141.175(c)(1)	If at any time the turbidity exceeds 1 NTU in representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system must inform the State as soon as possible, but no later than the end of the next business day.	OH In the event of a maximum combined filter effluent turbidity limit treatment technique violation, as specified in 8.2.4(a)(2), the supplier must consult with the Department as soon as possible but no later than 24 hours after the violation occurs.	C82 LS
141.175(c)(1)	If at any time the turbidity exceeds 1 NTU in representative samples of filtered water in a system using conventional filtration treatment or direct filtration, the system must inform the State as soon as possible, but no later than the end of the next business day.	STATE Adds - notice The Department shall determine from the consultation whether Tier 1 or Tier 2 public notice is required to protect public health. The supplier must distribute public notice as specified by the Department.	C82 LS
141.175(c)(1)	If at any time the turbidity in representative samples of filtered water exceeds the maximum level set by the State under §141.173(b) for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the system must inform the State as soon as possible, but no later than the end of the next business day.	OH In the event of a maximum combined filter effluent turbidity limit treatment technique violation, as specified in 8.2.4(a)(2), the supplier must consult with the Department as soon as possible but no later than 24 hours after the violation occurs.	C83 LS
141.175(c)(2)	If at any time the turbidity in representative samples of filtered water exceeds the maximum level set by the State under §141.173(b) for filtration technologies other than conventional filtration treatment, direct filtration, slow sand filtration, or diatomaceous earth filtration, the system must inform the State as soon as possible, but no later than the end of the next business day.	STATE Adds - notice Fed The Department shall determine from the consultation whether Tier 1 or Tier 2 public notice is required to protect public health. The supplier must distribute public notice as specified by the Department.	C83 LS
141.175(c)(2)			8.2.5(b)(1)

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	<p>The requirements of this subpart constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: Giardia lamblia, viruses, heterotrophic plate count bacteria, Legionella, Cryptosporidium and turbidity. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:</p>	<p>See comment 4 See plus below</p>	C84
141.5	<p>The requirements of this subpart constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: Giardia lamblia, viruses, heterotrophic plate count bacteria, Legionella, Cryptosporidium and turbidity. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:</p>	<p>For all surface water systems, the supplier must comply with the requirements specified in this article.</p>	8.1.1(a)
141.5	<p>The requirements of this subpart constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: Giardia lamblia, viruses, heterotrophic plate count bacteria, Legionella, Cryptosporidium and turbidity. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:</p>	<p>The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows:</p>	C84 8.1.2(a)

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	The requirements of this subpart constitute national primary drinking water regulations. These regulations establish requirements for filtration and disinfection that are in addition to criteria under which filtration and disinfection are required under subpart H of this part. The regulations in this subpart establish or extend treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: <i>Giardia lamblia</i> , viruses, heterotrophic plate count bacteria, <i>Legionella</i> , <i>Cryptosporidium</i> and turbidity. The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:		C84
141.5		At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:	8.1.2(a)(1)
	At least 99 percent (2-log) removal of <i>Cryptosporidium</i> between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer for filtered systems, or <i>Cryptosporidium</i> control under the watershed control plan for unfiltered systems; and	99 percent (2-log) removal of <i>Cryptosporidium</i> .	8.1.2(a)(1)(i)
141.500(a)			C85 LS
	<i>CPSS WITH IN COMPLETE DOES NOT INCLUDE ALL OF 141.530 - .544.</i>	A community or non-transient, non-community water systems supplying less than (<) 10,000 people and has a TTHM sample result greater than or equal to (=) 0.064 mg/L or has an HAA5 sample result greater than or equal to (=) 0.048 mg/L.	C86
141.500(b)	Compliance with the profiling and benchmark requirements in §§141.530 through 141.544.		8.4.1(a)(2)(ii)
		If the supplier fails to comply with the requirements specified in this section, 8.4, a disinfection profiling treatment technique violation occurs.	C86
141.500(b)	Compliance with the profiling and benchmark requirements in §§141.530 through 141.544.		8.4.4(a)
		If the supplier fails to comply with the requirements specified in this section, 8.5, a disinfection benchmarking treatment technique violation occurs.	C86
141.500(b)	Compliance with the profiling and benchmark requirements in §§141.530 through 141.544.		8.5.4(a)

141.501	You are subject to these requirements if your system:	For all surface water systems, the supplier must comply with the requirements specified in this article.	D104 8.1.1(a)
141.501	You are subject to these requirements if your system:	The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows:	D104 8.1.2(a)
141.501	You are subject to these requirements if your system:	At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:	D104 8.1.2(a)(1)
141.501(a)	Is a public water system;	For all surface water systems, the supplier must comply with the requirements specified in this article.	C87 8.1.1(a)
		The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows:	C87
141.501(a)	Is a public water system;	At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:	C87 8.1.2(a)
141.501(a)	Is a public water system;		C87 8.1.2(a)(1)
141.501(b)	Uses surface water or GWUDI as a source; and	For all surface water systems, the supplier must comply with the requirements specified in this article.	C88 8.1.1(a)

141.501(b)	Uses surface water or GWUDI as a source; and	The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows:	C 88	8.1.2(a)
141.501(b)	Uses surface water or GWUDI as a source; and	At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:	C 88	8.1.2(a)(1)
141.501(c)	Serves fewer than 10,000 persons.	For all surface water systems, the supplier must comply with the requirements specified in this article.	C 89	8.1.1(a)
141.501(c)	Serves fewer than 10,000 persons.	The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows:	C 89	8.1.2(a)
141.501(c)	Serves fewer than 10,000 persons.	At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:	C 89	8.1.2(a)(1)
141.502	You must comply with these requirements in this subpart beginning January 1, 2005, except where otherwise noted.	For all surface water systems, the supplier must comply with the requirements specified in this article.	141.502 C 89 8.1.1(a)	8.1.1(a)

		The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows:	NA
141.502	You must comply with these requirements in this subpart beginning January 1, 2005, except where otherwise noted.	At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:	NA 8.1.2(a)
141.502	You must comply with these requirements in this subpart beginning January 1, 2005, except where otherwise noted.		NA 8.1.2(a)(1)
141.503	There are seven requirements of this subpart, and you must comply with all requirements that are applicable to your system. These requirements are:	NO summary included	D104
141.503(a)	You must cover any finished-water reservoir that you began to construct on or after March 15, 2002 as described in §§141.510 and 141.511;	Does not fit 8.1.2(c) which is the definition. The supplier must not use uncovered finished water storage facilities.	C90 8.1.2(c)
141.503(b)	If your system is an unfiltered system, you must comply with the updated watershed control requirements described in §§141.520-141.522;	Colorado more stringent does not allow unfiltered systems	NA
141.503(c)	If your system is a community or non-transient non-community water systems you must develop a disinfection profile as described in §§141.530-141.536;	A system supplying greater than or equal to (=) 10,000 people and has a TTHM annual average of quarterly samples greater than or equal to (=) 0.064 mg/L or has an HAA5 annual average of quarterly samples greater than or equal to (=) 0.048 mg/L.	C91 8.4.1(a)(2)(i)
141.503(c)	If your system is a community or non-transient non-community water systems you must develop a disinfection profile as described in §§141.530-141.536;	A community or non-transient, non-community water systems supplying less than (<) 10,000 people and has a TTHM sample result greater than or equal to (=) 0.064 mg/L or has an HAA5 sample result greater than or equal to (=) 0.048 mg/L.	C91 8.4.1(a)(2)(ii)

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141.503(c)	If your system is a community or non-transient non-community water systems you must develop a disinfection profile as described in §§141.530-141.536;	If the supplier fails to comply with the requirements specified in this section, 8.5, a disinfection benchmarking treatment technique violation occurs.	C91	8.5.4(a)
141.503(d)	If your system is considering making a significant change to its disinfection practices, you must develop a disinfection benchmark and consult with the State for approval of the change as described in §§141.540-141.544;	If the supplier was required to develop a disinfection profile for Giardia lamblia and/or viruses as specified in 8.4 and plans to make a significant change in disinfection practices, as defined in 8.4.1(d), the supplier must comply with all of the following treatment technique requirements before making the change:	C92	8.5.1(a)
141.503(d)	If your system is considering making a significant change to its disinfection practices, you must develop a disinfection benchmark and consult with the State for approval of the change as described in §§141.540-141.544;	If the supplier fails to comply with the requirements specified in this section, 8.5, a disinfection benchmarking treatment technique violation occurs.	C92	8.5.4(a)
141.503(e)	If your system is a filtered system, you must comply with the combined filter effluent requirements as described in §§141.550-141.553;	This section includes all of 1550-553	refers to D104	8.1.2(b)(1)
141.503(f)	If your system is a filtered system that uses conventional or direct filtration, you must comply with the individual filter turbidity requirements as described in §§141.560-141.564; and	Cross with 1560-564 (refers to 1560-564) but does not include	C93	8.1.2(b)(1)
141.503(g)	You must comply with the applicable reporting and recordkeeping requirements as described in §§141.570 and 141.571.	Cross with 1560-564	C94	
141.51	Is my system subject to the new finished water reservoir requirements? All subpart H systems which serve fewer than 10,000 are subject to this requirement.	Cross with 1560-564 needs Giardia also For all surface water systems, the supplier must comply with the requirements specified in this article.	C95	8.1.1(a)

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	Is my system subject to the new finished water reservoir requirements? All subpart H systems which serve fewer than 10,000 are subject to this requirement.	141.51	The supplier must provide filtration and disinfection of surface water sources that meets the treatment technique requirements for all of the following: Cryptosporidium, Giardia lamblia, viruses, Heterotrophic Plate Count bacteria, Legionella, and turbidity. These treatment techniques are as follows: At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:	C95	8.1.2(a)
	Is my system subject to the new finished water reservoir requirements? All subpart H systems which serve fewer than 10,000 are subject to this requirement.	141.51	At a point between where the source water is not subject to recontamination and the entry point, the supplier must install and properly operate water treatment processes which reliably achieve at least the following levels of treatment:	C95	8.1.2(a)(1)
	If your system begins construction of a finished water reservoir on or after March 15, 2002 the reservoir must be covered. Finished water reservoirs for which your system began construction prior to March 15, 2002 are not subject to this requirement.	141.511	see C90	C96	8.1.2(c)
	Is my system subject to the updated watershed control requirements? If you are a subpart H system serving fewer than 10,000 persons which does not provide filtration, you must continue to comply with all of the filtration avoidance criteria in §141.71, as well as the additional watershed control requirements in §141.521.	141.52	The supplier must not use uncovered finished water storage facilities.	N/A	
	What updated watershed control requirements must my unfiltered system implement to continue to avoid filtration? Your system must take any additional steps necessary to minimize the potential for contamination by Cryptosporidium oocysts in the source water. Your system's watershed control program must, for Cryptosporidium :	141.521	more stringent All PWSs must filter	N/A	

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	Identify watershed characteristics and activities which may have an adverse effect on source water quality; and		N/A
141.521(a)	Monitor the occurrence of activities which may have an adverse effect on source water quality.		N/A
141.521(b)	How does the State determine whether my system's watershed control requirements are adequate? During an onsite inspection conducted under the provisions of §141.71(b)(3), the State must determine whether your watershed control program is adequate to limit potential contamination by Cryptosporidium oocysts. The adequacy of the program must be based on the comprehensiveness of the watershed review; the effectiveness of your program to monitor and control detrimental activities occurring in the watershed; and the extent to which your system has maximized land ownership and/or controlled land use within the watershed.		N/A
141.522			
141.53	<p>A disinfection profile is a graphical representation of your system's level of Giardia lamblia or virus inactivation measured during the course of a year. If you are a subpart H community or non-transient non-community water system which serves fewer than 10,000 persons, your system must develop a disinfection profile unless your State determines that your system's profile is unnecessary. Your State may approve the use of a more representative data set for disinfection profiling than the data set required under §§141.532-141.536.</p> <p>→ Not addressed</p>	<p>not the same</p> <p>→ cross with 14.1 complete 8.4.1 is the only place it states must for profile</p> <p>→ Did not include which causes problems in the program</p> <p>Choose not to collect the TTHM and HAA5 data, if the supplier notifies the Department of the decision. The supplier must therefore develop a disinfection profile to determine log inactivation of Giardia lamblia under 8.4.1(a)(2).</p>	<p>8.4.1(a)(1)(iii)</p> <p>8.4.1(a)(1)(iii)</p>

141.53	A disinfection profile is a graphical representation of your system's level of Giardia lamblia or virus inactivation measured during the course of a year. If you are a subpart H community or non-transient non-community water system which serves fewer than 10,000 persons, your system must develop a disinfection profile unless your State determines that your system's profile is unnecessary. Your State may approve the use of a more representative data set for disinfection profiling than the data set required under §§141.532–141.536.	The supplier must comply with the treatment technique requirement to develop a disinfection profile to determine log inactivation of Giardia lamblia if the system meets either of the following criteria: 8.4.1(a)(2)	C97 LS?
141.53	A disinfection profile is a graphical representation of your system's level of Giardia lamblia or virus inactivation measured during the course of a year. If you are a subpart H community or non-transient non-community water system which serves fewer than 10,000 persons, your system must develop a disinfection profile unless your State determines that your system's profile is unnecessary. Your State may approve the use of a more representative data set for disinfection profiling than the data set required under §§141.532–141.536.	A community or non-transient, non-community water systems supplying less than (<) 10,000 people and has a TTHM sample result greater than or equal to (=) 0.064 mg/L or has an HAA5 sample result greater than or equal to (=) 0.048 mg/L. 8.4.1(a)(2)(ii)	C97 LS?
141.531	States may only determine that a system's profile is unnecessary if a system's TTHM and HAA5 levels are below 0.064 mg/L and 0.048 mg/L, respectively. To determine these levels, TTHM and HAA5 samples must be collected after January 1, 1998, during the month with the warmest water temperature, and at the point of maximum residence time in your distribution system. Your State may approve a more representative TTHM and HAA5 data set to determine these levels.	<p>The state may determine profiling is unnecessary.</p> <p>Criteria not included</p> <p>The supplier must collect TTHM and HAA5 samples that meet the routine sampling requirements specified in 25.1.3 and submit the results to the Department. Alternatively, the supplier may:</p> <p>144</p>	C98 LS?

141.531	States may only determine that a system's profile is unnecessary if a system's TTHM and HAA5 levels are below 0.064 mg/L and 0.048 mg/L, respectively. To determine these levels, TTHM and HAA5 samples must be collected after January 1, 1998, during the month with the warmest water temperature, and at the point of maximum residence time in your distribution system. Your State may approve a more representative TTHM and HAA5 data set to determine these levels.	Choose not to collect the TTHM and HAA5 data, if the supplier notifies the Department of the decision. The supplier must therefore develop a disinfection profile to determine log inactivation of Giardia lamblia under 8.4.1(a)(2).	C98 LS?
141.531	States may only determine that a system's profile is unnecessary if a system's TTHM and HAA5 levels are below 0.064 mg/L and 0.048 mg/L, respectively. To determine these levels, TTHM and HAA5 samples must be collected after January 1, 1998, during the month with the warmest water temperature, and at the point of maximum residence time in your distribution system. Your State may approve a more representative TTHM and HAA5 data set to determine these levels.	A community or non-transient, non-community water systems supplying less than (<) 10,000 people and has a TTHM sample result greater than or equal to (=) 0.064 mg/L or has an HAA5 sample result greater than or equal to (=) 0.048 mg/L.	C98 LS?
141.532	A disinfection profile consists of three steps: First, your system must collect data for several parameters from the plant as discussed in §141.533 over the course of 12 months. If your system serves between 500 and 9,999 persons you must begin to collect data no later than July 1, 2003. If your system serves fewer than 500 persons you must begin to collect data no later than January 1, 2004.	Does not include LS? 2 cite? not same information For new surface water systems or reclassified systems that now meet the applicability of this article, applicability for this section, 8.4, is determined by evaluating TTHM and HAA5 sample results. Applicability must be determined no later than 12 months after the system is classified as a surface water system.	C98 LS? C98 LS?
141.532(b)	Second, your system must use this data to calculate weekly log inactivation as discussed in §141.534 and 141.535, and	Cross with inco-plate cite	C101 8.4.1(a)
141.532(c)	Third, your system must use these weekly log inactivations to develop a disinfection profile as specified in §141.536.	11	C102

	Your system must monitor the following parameters to determine the total log inactivation using the analytical methods in §141.74 (a), once per week on the same calendar day, over 12 consecutive months:	To determine the log inactivation ratio(s) for each disinfection segment before the distribution system, the supplier must monitor the following set of parameters during daily peak hourly flow:	C103 LS?
141.533	Your system must monitor the following parameters to determine the total log inactivation using the analytical methods in §141.74 (a) once per week on the same calendar day, over 12 consecutive months:	<i>not included</i> The supplier must monitor the set of parameters specified in 8.4.2(a) at the following frequencies:	C103 8.4.2(b)
141.533	Your system must monitor the following parameters to determine the total log inactivation using the analytical methods in §141.74 (a), once per week on the same calendar day, over 12 consecutive months:	For systems meeting the criteria as specified in 8.4.1(a)(2)(ii) or 8.4.1(b), at least weekly on the same calendar day for 12 consecutive months.	C103 8.4.2(b)(2)
141.533(a)	The temperature of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;	The temperature of the disinfected water at each residual disinfectant concentration sampling location or at an alternative Department-approved location(s).	C104 8.4.2(a)(2)
141.533(b)	If your system uses chlorine, the pH of the disinfected water at each residual disinfectant concentration sampling point during peak hourly flow;	For systems using chlorine, the pH of the disinfected water at each residual disinfectant concentration sampling location or at an alternative Department-approved location(s).	C105 8.4.2(a)(3)
141.533(c)	The disinfectant contact time(s) ("T") during peak hourly flow; and	System-specific parameters to determine the disinfectant contact time(s) (T). <i>where can these be found</i>	C106 8.4.2(a)(4)
141.533(d)	The residual disinfectant concentration(s) ("C") of the water before or at the first customer and prior to each additional point of disinfection during peak hourly flow.	<i>not sure</i> The residual disinfectant concentration(s) (C) at each entry point.	C107 LS? 8.4.2(a)(1)
141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia: <i>CROSSWEITH does</i>	<i>CT tables NOT included SAME COMMENTS AS C61 AND C63</i> For systems with one point of disinfectant application and multiple disinfection segments, the supplier must also monitor before each sequential segment of disinfection.	C108 LS? 8.4.2(a)(1)(i)

NOT include Table 141.534

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141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:	For systems with multiple points of disinfectant application, the supplier must also monitor before each additional point of disinfectant application.	C108 L5?
141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:	For each set of parameters collected under 8.4.2, the supplier must calculate total inactivation ratio(s) and total logs of inactivation for Giardia lamblia based on the CT99.9 values in Article 10 as follows: <i>not there</i>	C108 L5?
141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:	The supplier must determine the total inactivation ratio as follows: Inactivation ratio is equal to: (CTcalc/CT99.9).	C108 L5?
141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:	For a supplier monitoring at a single location, calculate one inactivation ratio.	C108 L5?
141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:	For a supplier monitoring at multiple locations:	8.4.3(a)(1)(ii)
141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:	Determine the inactivation ratio value for each segment.	8.4.3(a)(1)(ii)(A)

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141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:	Add all inactivation ratio values to determine the total inactivation ratio: (S (CTcalc/CT99.9)).	C108 658
141.534	Use the tables in §141.74(b)(3)(v) to determine the appropriate CT99.9 value. Calculate the total inactivation ratio as follows, and multiply the value by 3.0 to determine log inactivation of Giardia lamblia:	The supplier must determine the total logs of inactivation by multiplying the total inactivation ratio by 3.0. Total logs of inactivation is equal to: $3.0 \times S$ (CTcalc/CT99.9).	C108 658 8.4.3(a)(2)
141.535	If your system uses chloramines, ozone, or chlorine dioxide for primary disinfection, you must also calculate the logs of inactivation for viruses and develop an additional disinfection profile for viruses using methods approved by the State.	more stringent For systems that use chloramines, ozone, or chlorine dioxide that meet the criteria specified in 8.4.1(a)(2), the supplier must also develop a disinfection profile to determine log inactivation of viruses.	C109 8.4.1(a)(3)
141.535	If your system uses chloramines, ozone, or chlorine dioxide for primary disinfection, you must also calculate the logs of inactivation for viruses and develop an additional disinfection profile for viruses using methods approved by the State.	If the supplier is required to calculate the logs of inactivation for viruses as specified in 8.4.1(a)(3) or 8.4.1(b), the supplier must use a Department-approved calculation method.	C109 8.4.3(b)
141.536	Each log inactivation serves as a data point in your disinfection profile. Your system will have obtained 52 measurements (one for every week of the year). This will allow your system and the State the opportunity to evaluate how microbial inactivation varied over the course of the year by looking at all 52 measurements (your Disinfection Profile). Your system must retain the Disinfection Profile data in graphic form, such as a spreadsheet, which must be available for review by the State as part of a sanitary survey. Your system must use this data to calculate a benchmark if you are considering changes to disinfection practices.	no reference to where this is located in crosswalk The supplier must maintain disinfection profile data in graphic form, as a spreadsheet, or in a Department-accepted format for review as part of sanitary surveys.	C110 8.4.3(c)

141.54	If you are a subpart H system required to develop a disinfection profile under §§141.530 through 141.536, your system must develop a Disinfection Benchmark if you decide to make a significant change to your disinfection practice. Your system must consult with the State for approval before you can implement a significant disinfection practice change.	Subpart H If the supplier was required to develop a disinfection profile for Giardia lamblia and/or viruses as specified in 8.4 and plans to make a significant change in disinfection practices, as defined in 8.4.1(d), the supplier must comply with all of the following treatment technique requirements before making the change:	CIII
141.54	If you are a subpart H system required to develop a disinfection profile under §§141.530 through 141.536, your system must develop a Disinfection Benchmark if you decide to make a significant change to your disinfection practice. Your system must consult with the State for approval before you can implement a significant disinfection practice change.	Calculate a disinfection benchmark for each profile developed under 8.4.3. <i>confusing</i>	CIII 8.5.1(a)(1)
141.54	If you are a subpart H system required to develop a disinfection profile under §§141.530 through 141.536, your system must develop a Disinfection Benchmark if you decide to make a significant change to your disinfection practice. Your system must consult with the State for approval before you can implement a significant disinfection practice change.	OH Consult with the Department.	8.5.1(a)(2)
141.541	Significant changes to disinfection practice include:	Significant changes in disinfection practice means one or more of the following:	D/OH 8.4.1(d)
141.541(a)	Changes to the point of disinfection;	Changes to the point of disinfection.	ND 8.4.1(d)(1)
141.541(b)	Changes to the disinfectant(s) used in the treatment plant;	Changes to the disinfectant(s) used in the treatment plant.	ND 8.4.1(d)(2)
141.541(c)	Changes to the disinfection process; or	Changes to the disinfection process.	ND 8.4.1(d)(3)
141.541(d)	Any other modification identified by the State.	Any other modification identified by the Department.	ND 8.4.1(d)(4)

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	If your system is considering a significant change to its disinfection practice, your system must calculate a disinfection benchmark(s) as described in §§141.543 and 141.544 and provide the benchmark(s) to your State. Your system may only make a significant disinfection practice change after consulting with the State for approval. Your system must submit the following information to the State as part of the consultation and approval process:		C 112
141.542	part of the consultation and approval process:	The supplier must submit all of the following information as part of the consultation process:	8.5.3(a)
141.542(a)	A description of the proposed change:	A description of the proposed change in disinfection practice.	D104 8.5.3(a)(1)
141.542(b)	The disinfection profile for Giardia lamblia (and, if necessary, viruses) and disinfection benchmark;	The disinfection profile and benchmark for Giardia lamblia. If required to be developed, the disinfection profile and benchmark for viruses.	D104 8.5.3(a)(2)
141.542(b)	The disinfection profile for Giardia lamblia (and, if necessary, viruses) and disinfection benchmark;	If required to be developed, the disinfection profile and benchmark for viruses.	D104 8.5.3(a)(3)
141.542(c)	An analysis of how the proposed change will affect the current levels of disinfection; and	An analysis of how the proposed change will affect the current levels of disinfection.	ND 8.5.3(a)(4)
141.542(d)	Any additional information requested by the State.	Any additional information requested by the Department.	ND 8.5.3(a)(5)
	If your system is making a significant change to its disinfection practice, it must calculate a disinfection benchmark using the procedure specified in the following table.	The supplier must calculate a disinfection benchmark as follows:	C113 8.5.2(a)
141.543	If your system is making a significant change to its disinfection practice, it must calculate a disinfection benchmark using the procedure specified in the following table.	STEP 1: Use Cleaver language Calculate the average log inactivation for each month using the total logs of inactivation value(s) calculated in the disinfection profile developed under 8.4.3.	C114 8.5.2(a)(1)
141.543	If your system is making a significant change to its disinfection practice, it must calculate a disinfection benchmark using the procedure specified in the following table.	IF THE SUPPLIER HAS COLLECTED ONE YEAR OF DATA, THE LOWEST MONTHLY AVERAGE LOG INACTIVATION VALUE IS THE DISINFECTION BENCHMARK.	C115 8.5.2(a)(2)

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	If your system uses chloramines, ozone or chlorine dioxide for primary disinfection your system must calculate the disinfection benchmark from the data your system collected for viruses to develop the disinfection profile in addition to the Giardia lamblia disinfection benchmark calculated under §141.543. This viral benchmark must be calculated in the same manner used to calculate the Giardia lamblia disinfection benchmark in §141.543.	<i>Crosswalk incomplete</i>	C116	8.5.1(a)(1)
141.544	If your system uses chloramines, ozone or chlorine dioxide for primary disinfection your system must calculate the disinfection benchmark from the data your system collected for viruses to develop the disinfection profile in addition to the Giardia lamblia disinfection benchmark calculated under §141.543. This viral benchmark must be calculated in the same manner used to calculate the Giardia lamblia disinfection benchmark in §141.543.	Calculate a disinfection benchmark for each profile developed under 8.4.3.	C116	8.5.1(a)(1)
141.544	All subpart H systems which serve populations fewer than 10,000, are required to filter, and utilize filtration other than slow sand filtration or diatomaceous earth filtration must meet the combined filter effluent turbidity requirements of §§141.551-141.553. If your system uses slow sand or diatomaceous earth filtration you are not required to meet the combined filter effluent turbidity limits of subpart T, but you must continue to meet the combined filter effluent turbidity limits in §141.73.	<i>noted generally OK</i>	D104	8.2.1(a)
141.551	Your system must meet two strengthened combined filter effluent turbidity limits.	For all surface water systems, the supplier must comply with the requirements specified in this section, 8.2.1(a) <i>Crosswalk 11-10-2014 OK</i>	C117	8.2.1(a)
141.551	Your system must meet two strengthened combined filter effluent turbidity limits.	At the combined filter effluent, the supplier must:	C117	8.2.2(a)(1)
141.551	effluent turbidity limits.	Action Levels and MCLGs for Lead and Copper	C117	45.7

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141.551	Your system must meet two strengthened combined filter effluent turbidity limits.	The following action levels for lead and copper apply to all community and non-transient, non-community water systems.	C117 45.7(a)
	The first combined filter effluent turbidity limit is a "95th percentile" turbidity limit that your system must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	<i>not included</i> Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month.	C118 LS? 8.2.2(a)(1)(i)
141.551(a)	The first combined filter effluent turbidity limit is a "95th percentile" turbidity limit that your system must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	<i>W/H here</i> see 141.550 1 NTU in 95 percent of measurements collected each month; and	C118 8.2.2(b)(2)(i)
141.551(a)	The first combined filter effluent turbidity limit is a "95th percentile" turbidity limit that your system must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	The following constitute combined filter effluent treatment technique violations:	C118 8.2.4(a)

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141.551(a)	The first combined filter effluent turbidity limit is a "95th percentile" turbidity limit that your system must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	More than 5 percent of turbidity monitoring results in any month are greater than (>) the applicable 95th percentile limits specified in Table 8-1.	C118
141.551(a)	The first combined filter effluent turbidity limit is a "95th percentile" turbidity limit that your system must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	Action Levels and MCLGs for Lead and Copper	C118 45.7
141.551(a)	The first combined filter effluent turbidity limit is a "95th percentile" turbidity limit that your system must meet in at least 95 percent of the turbidity measurements taken each month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	The following action levels for lead and copper apply to all community and non-transient, non-community water systems.	C118 45.7(a)
141.551(b)	The second combined filter effluent turbidity limit is a "maximum" turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	not included Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.	C118 8.2.2(a)(1)(ii)

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	The second combined filter effluent turbidity limit is a "maximum" turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.		C119
141.551(b)	The second combined filter effluent turbidity limit is a "maximum" turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	5 NTU at any time.	8.2.2(b)(2)(ii)
141.551(b)	The second combined filter effluent turbidity limit is a "maximum" turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	The following constitute combined filter effluent treatment technique violations:	C119 8.2.4(a)
141.551(b)	The second combined filter effluent turbidity limit is a "maximum" turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	At any time a turbidity monitoring result is greater than (>) the applicable maximum turbidity limit specified in Table 8-1.	C119 8.2.4(a)(2)
141.551(b)	The second combined filter effluent turbidity limit is a "maximum" turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	Action Levels and MCLGs for Lead and Copper	C119 45.7

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141.551(b)	The second combined filter effluent turbidity limit is a "maximum" turbidity limit which your system may at no time exceed during the month. Measurements must continue to be taken as described in §141.74(a) and (c). Monthly reporting must be completed according to §141.570. The following table describes the required limits for specific filtration technologies.	The following action levels for lead and copper apply to all community and non-transient, non-community water systems.	C119
141.552(a)	If your system consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) you are required to conduct a demonstration (see tables in §141.551). Your system must demonstrate to the State, using pilot plant studies or other means, that your system's filtration, in combination with disinfection treatment, consistently achieves:	At the combined filter effluent, the supplier must:	D104 8.2.2(a)(1)
141.552(a)	If your system consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) you are required to conduct a demonstration (see tables in §141.551). Your system must demonstrate to the State, using pilot plant studies or other means, that your system's filtration, in combination with disinfection treatment, consistently achieves:	Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month.	D104 8.2.2(a)(1)(i)
141.552(a)	If your system consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) you are required to conduct a demonstration (see tables in §141.551). Your system must demonstrate to the State, using pilot plant studies or other means, that your system's filtration, in combination with disinfection treatment, consistently achieves:	Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.	D104 8.2.2(a)(1)(ii)

	If your system consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) you are required to conduct a demonstration (see tables in §141.551). Your system must demonstrate to the State, using pilot plant studies or other means, that your system's filtration, in combination with disinfection treatment, consistently achieves:	If approved by the Department, the supplier may use alternative filtration technologies including membrane filtration or filtration technologies other than those specified in Table 8-1.	D/O/H 8.2.2(b)
141.552(a)	If your system consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) you are required to conduct a demonstration (see tables in §141.551). Your system must demonstrate to the State, using pilot plant studies or other means, that your system's filtration, in combination with disinfection treatment, consistently achieves:	In order for the Department to approve an alternative filtration technology, the supplier must demonstrate, using pilot plant studies or other means, that the filtration technology, in combination with the disinfection treatment as specified in 8.3.2, consistently achieves 99 percent (2-log) removal of Cryptosporidium, 99.9 percent (3-log) removal and inactivation of Giardia lamblia, 99.99 percent (4-log) removal and inactivation of viruses.	D/O/H 8.2.2(b)(1)
141.552(a)	If your system consists of alternative filtration (filtration other than slow sand filtration, diatomaceous earth filtration, conventional filtration, or direct filtration) you are required to conduct a demonstration (see tables in §141.551). Your system must demonstrate to the State, using pilot plant studies or other means, that your system's filtration, in combination with disinfection treatment, consistently achieves:	If the Department approves the use of an alternative filtration technology, the Department shall approve combined filter effluent turbidity limits which are no greater than:	D/O/H 8.2.2(b)(2)
141.552(a)(1)	99 percent removal of Cryptosporidium oocysts;	At the combined filter effluent, the supplier must:	D/O/H 8.2.2(a)(1)
141.552(a)(1)	99 percent removal of Cryptosporidium oocysts;	Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month.	D/O/H 8.2.2(a)(1)(i)

141.552(a)(1)	99 percent removal of Cryptosporidium oocysts;	Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.	D104 8.2.2(a)(1)(ii)
141.552(a)(1)	99 percent removal of Cryptosporidium oocysts;	If approved by the Department, the supplier may use alternative filtration technologies including membrane filtration or filtration technologies other than those specified in Table 8-1.	D104 8.2.2(b)
141.552(a)(1)	99 percent removal of Cryptosporidium oocysts;	In order for the Department to approve an alternative filtration technology, the supplier must demonstrate, using pilot plant studies or other means, that the filtration technology, in combination with the disinfection treatment as specified in 8.3.2, consistently achieves 99 percent (2-log) removal of Cryptosporidium, 99.9 percent (3-log) removal and inactivation of Giardia lamblia, 99.99 percent (4-log) removal and inactivation of viruses.	8.2.2(b)(1)
141.552(a)(1)	99 percent removal of Cryptosporidium oocysts;	If the Department approves the use of an alternative filtration technology, the Department shall approve combined filter effluent turbidity limits which are no greater than:	D104 8.2.2(b)(2)
141.552(a)(1)	99 percent removal of Cryptosporidium oocysts;	At the combined filter effluent, the supplier must:	C120 8.2.2(a)(1)
141.552(a)(2)	99.9 percent removal and/or inactivation of Giardia lamblia cysts; and	Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month.	C120 8.2.2(a)(1)(i)
141.552(a)(2)	99.9 percent removal and/or inactivation of Giardia lamblia cysts; and	Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.	C120 8.2.2(a)(1)(ii)
141.552(a)(2)	99.9 percent removal and/or inactivation of Giardia lamblia cysts; and	If approved by the Department, the supplier may use alternative filtration technologies including membrane filtration or filtration technologies other than those specified in Table 8-1.	C120 8.2.2(b)

		In order for the Department to approve an alternative filtration technology, the supplier must demonstrate, using pilot plant studies or other means, that the filtration technology, in combination with the disinfection treatment as specified in 8.3.2, consistently achieves 99 percent (2-log) removal of Cryptosporidium, 99.9 percent (3-log) removal and inactivation of Giardia lamblia, 99.99 percent (4-log) removal and inactivation of viruses.	C120
141.552(a)(2)	99.9 percent removal and/or inactivation of Giardia lamblia cysts; and	If the Department approves the use of an alternative filtration technology, the Department shall approve combined filter effluent turbidity limits which are no greater than:	C120
141.552(a)(2)	99.9 percent removal and/or inactivation of Giardia lamblia cysts; and	At the combined filter effluent, the supplier must:	8.2.2(b)(2)
141.552(a)(3)	99.99 percent removal and/or inactivation of viruses.	Maintain treated water turbidity levels of less than or equal to (=) the 95th percentile limit specified in Table 8-1 in at least 95 percent of the turbidity monitoring results collected each month.	C121 LS2
141.552(a)(3)	99.99 percent removal and/or inactivation of viruses.	Maintain treated water turbidity levels that are less than or equal to (=) the maximum limit specified in Table 8-1 at all times.	8.2.2(a)(1)(i)
141.552(a)(3)	99.99 percent removal and/or inactivation of viruses.	If approved by the Department, the supplier may use alternative filtration technologies including membrane filtration or filtration technologies other than those specified in Table 8-1.	C121 8.2.2(a)(1)(ii)
141.552(a)(3)	99.99 percent removal and/or inactivation of viruses.		8.2.2(b)

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141.552(a)(3)	99.99 percent removal and/or inactivation of viruses.	In order for the Department to approve an alternative filtration technology, the supplier must demonstrate, using pilot plant studies or other means, that the filtration technology, in combination with the disinfection treatment as specified in 8.3.2, consistently achieves 99 percent (2-log) removal of <i>Cryptosporidium</i> , 99.9 percent (3-log) removal and inactivation of <i>Giardia lamblia</i> , 99.99 percent (4-log) removal and inactivation of viruses.	C/21	8.2.2(b)(1)
141.552(a)(3)	99.99 percent removal and/or inactivation of viruses.	If the Department approves the use of an alternative filtration technology, the Department shall approve combined filter effluent turbidity limits which are no greater than:	C/21	8.2.2(b)(2)
141.552(b)	[Reserved]			
141.553	If your system practices lime softening, you may acidify representative combined filter effluent turbidity samples prior to analysis using a protocol approved by the State.	For systems using lime softening, the supplier may acidify turbidity samples before analysis using a Department-approved protocol.	D/04	8.2.3(b)
141.553	If your system practices lime softening, you may acidify representative combined filter effluent turbidity samples prior to analysis using a protocol approved by the State.	For systems using lime softening, the supplier may acidify turbidity samples before analysis using a Department-approved protocol.	D/04	8.2.7(a)(5)
141.56	If your system is a subpart H system serving fewer than 10,000 people and utilizing conventional filtration or direct filtration, you must conduct continuous monitoring of turbidity for each individual filter at your system. The following requirements apply to continuous turbidity monitoring:	For systems using conventional filtration treatment or direct filtration, the supplier must monitor turbidity continuously at locations representative of each individual filter effluent.		8.2.7(a)
141.560(a)	Monitoring must be conducted using an approved method in §141.74(a);	NOT IF checked	C/22	
141.560(b)	Calibration of turbidimeters must be conducted using procedures specified by the manufacturer;	The supplier must calibrate the continuous monitoring equipment using the manufacturer-specified procedure.	D/04	8.2.7(a)(2)

141.560(c)	Results of turbidity monitoring must be recorded at least every 15 minutes;	The supplier must record the individual filter effluent turbidity monitoring results at least every 15 minutes.	C123 8.2.7(a)(1)
141.560(d)	Monthly reporting must be completed according to §141.570; and <i>not included in crosscheck</i>	For individual filter effluent turbidity monitoring, the supplier must submit documentation that the monitoring was conducted, no later than the 10th of the following month in which the monitoring was conducted.	C123 8.2.8(a)
141.560(e)	Records must be maintained according to §141.571. <i>not included in crosscheck</i>	The supplier must maintain all of the following information for at least three years: The results of individual filter monitoring collected under 8.2.7.	C124 36.4.2(a)
141.560(e)	Records must be maintained according to §141.571.		C124 36.4.2(a)(1)
141.561	If there is a failure in the continuous turbidity monitoring equipment, your system must conduct grab sampling every four hours in lieu of continuous monitoring until the turbidimeter is back on-line. Your system has 14 days to resume continuous monitoring before a violation is incurred.	If there is a failure of the continuous monitoring equipment, the supplier must monitor the individual filter effluent turbidity by collecting a grab sample no later than four hours after the last recorded monitoring result and continue collecting grab samples every four hours until the continuous monitoring equipment is returned to service.	C125 LS7 8.2.7(a)(3)
141.561	If there is a failure in the continuous turbidity monitoring equipment, your system must conduct grab sampling every four hours in lieu of continuous monitoring until the turbidimeter is back on-line. Your system has 14 days to resume continuous monitoring before a violation is incurred.	<i>not included</i> For systems supplying less than (<) 10,000 people, the supplier must resume continuous individual filter effluent turbidity monitoring no later than 14 days after the equipment failure.	C125 LS7 8.2.7(a)(3)(ii)
141.562	Yes, if your system only consists of two or fewer filters, you may conduct continuous monitoring of combined filter effluent turbidity in lieu of individual filter effluent turbidity monitoring. Continuous monitoring must meet the same requirements set forth in §141.560(a) through (d) and §141.561.	For systems supplying less than (<) 10,000 people that consist of two or fewer filters, the supplier may conduct continuous combined filter effluent turbidity monitoring to represent individual filter effluent turbidity monitoring.	C126 LS8 8.2.7(a)(4)

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141.562	Yes, if your system only consists of two or fewer filters, you may conduct continuous monitoring of combined filter effluent turbidity in lieu of individual filter effluent turbidity monitoring. Continuous monitoring must meet the same requirements set forth in §141.560(a) through (d) and §141.561.	not the same	Continuous combined filter effluent turbidity monitoring must meet the requirements specified in 8.2.7(a)(1-3).	C126 LS?	8.2.7(a)(4)(i)
141.563	Follow-up action is required according to the following tables:	Response to Individual Filter Effluent Turbidity Monitoring Results for Systems Supplying Less Than (<) 10,000 People		C127 LS?	8.2.10
	<i>Does not include language for 2 filters</i>	If the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 1.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs and the supplier must submit all of the following no later than the 10th of the month following the exceedance:		C127 LS?	
141.563	Follow-up action is required according to the following tables:	Which filter exceeded.		D104	8.2.10(a)
141.563	Follow-up action is required according to the following tables:	Date of the exceedance.		D104	8.2.10(a)(1)
141.563	Follow-up action is required according to the following tables:	Turbidity monitoring results which exceeded 1.0 NTU.		D104	8.2.10(a)(2)
141.563	Follow-up action is required according to the following tables:	Cause for the exceedance, if known.		D104	8.2.10(a)(3)
141.563	<i>missing language for 2 filters</i>	If, in each month, for three consecutive months the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 1.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs.		C128 LS?	8.2.10(a)(4)
141.563	Follow-up action is required according to the following tables:	The supplier must conduct a self-assessment of that filter no later than 14 days after the exceedance occurs, unless a CPE is required as specified in 8.2.10(c).		D104	8.2.10(b)
141.563	Follow-up action is required according to the following tables:				8.2.10(b)(1)

	Follow-up action is required according to the following tables:	For systems with two or fewer filters that monitor combined filter effluent instead of individual filter effluent as specified in 8.2.7(a)(4), the supplier must conduct the self-assessment on both filters.	D104 8.2.10(b)(1)(i)
141.563	Follow-up action is required according to the following tables:	The self-assessment must include at least all of the following:	D104 8.2.10(b)(2)
141.563	Follow-up action is required according to the following tables:	Assessment of filter performance.	D104 8.2.10(b)(2)(i)
141.563	Follow-up action is required according to the following tables:	Development of a filter profile.	D104 8.2.10(b)(2)(ii)
141.563	Follow-up action is required according to the following tables:	Identification and prioritization of factors limiting filter performance.	D104 8.2.10(b)(2)(iii)
141.563	Follow-up action is required according to the following tables:	Assessment of the applicability of corrections.	D104 8.2.10(b)(2)(iv)
141.563	Follow-up action is required according to the following tables:	Preparation of a written self-assessment report.	D104 8.2.10(b)(2)(v)
	Follow-up action is required according to the following tables:	In addition to the reporting requirements specified in 8.2.10(a), the supplier must submit all of the following no later than the 10th of the month following the exceedance:	D104 8.2.10(b)(3)
141.563	Follow-up action is required according to the following tables:	The date the self-assessment was triggered.	D104 8.2.10(b)(3)(i)
141.563	Follow-up action is required according to the following tables:	The date the self-assessment was completed.	D104 8.2.10(b)(3)(ii)
	Follow-up action is required according to the following tables:	If, in each month, for two consecutive months, the individual filter effluent turbidity monitoring results at the same filter are greater than (>) 2.0 NTU in two consecutive recordings collected 15 minutes apart, an exceedance occurs.	D104 8.2.10(c)
141.563	Follow-up action is required according to the following tables:	No later than 60 days after the exceedance occurs, the supplier must arrange for a CPE to be conducted by the Department or by a Department-approved third party.	D104 8.2.10(c)(1)

141.563	Follow-up action is required according to the following tables:	No later than 120 days after the exceedance occurs, the supplier must submit the completed CPE report.	D/04 8.2.10(c)(2)
141.563	Follow-up action is required according to the following tables:	The supplier is not required to arrange for a CPE and submit a CPE report if:	D/04 8.2.10(c)(3)
141.563	Follow-up action is required according to the following tables:	A CPE has been completed by the Department or by a Department-approved third party within the last 12 months, or	D/04 8.2.10(c)(3)(i)
141.563	Follow-up action is required according to the following tables:	The supplier and Department are participating in an ongoing CTAP at the system.	D/04 8.2.10(c)(3)(iii)
141.564	If your system utilizes lime softening, you may apply to the State for alternative turbidity exceedance levels for the levels specified in the table in §141.563. You must be able to demonstrate to the State that higher turbidity levels are due to lime carryover only, and not due to degraded filter performance	For systems using lime softening, the supplier may apply to the Department for higher individual filter effluent turbidity limits than the limits specified in this subsection, 8.2.10, if the supplier can demonstrate that higher individual filter effluent turbidity limits are due only to lime carryover and not due to degraded filter performance.	D/04 8.2.10(d)
141.570	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	NO GENERAL STATEMENT OF REPORTING FOR 141.570 SUPPLIER'S CPE REPORTING RESULTS FOR COMBINED FILTER EFFLUENT TURBIDITY MONITORING RESULTS COLLECTED UNDER 8.2.3, THE SUPPLIER MUST SUBMIT THE FOLLOWING INFORMATION NO LATER THAN THE 10th OF THE FOLLOWING MONTH:	C/30 L/30
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	Number of combined filter effluent turbidity monitoring results recorded during the month.	C/31 L/31 8.2.6(a)(1)

Table for 141.570 not included

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141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	Number and percentage of combined filter effluent turbidity monitoring results recorded during the month that were greater than (>) the turbidity limits specified in 8.2.2.	C132 LS?
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	The date and value of any combined filter effluent turbidity monitoring results collected during the month, which were greater than (>) the maximum turbidity limit.	D104 8.2.6(a)(3)
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	<i>Cites 141.560-141.64 not included</i> For individual filter effluent turbidity monitoring, the supplier must submit documentation that the monitoring was conducted, no later than the 10th of the following month in which the monitoring was conducted.	C133
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	<i>title for 8.2.9 & 8.2.10 "Response to reporting tied into one section collecting. see appendix B30 in addition to the reporting requirements specified in 8.2.10(a), the supplier must submit all of the following no later than the 10th of the month following the exceedance:</i>	C134 LS?

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141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.		D104
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	The date the self-assessment was triggered.	8.2.10(b)(3)(i)
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	<p><i>Do not include information in 3rd column associated</i></p> <p>The date the self-assessment was completed.</p>	<p><i>C135</i></p> <p><i>LS?</i></p> <p>8.2.10(b)(3)(iii)</p>
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	No later than 120 days after the exceedance occurs, the supplier must submit the completed CPE report.	<p><i>D104</i></p> <p>8.2.10(c)(2)</p>
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	In addition to the reporting requirements specified in 8.2.10(a), if a CPE is required, the supplier must submit all of the following no later than the 10th of the month following the exceedance:	<p><i>D104</i></p> <p>8.2.10(c)(4)</p>

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141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	That a CPE is required.	D/OK
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	The date the CPE was triggered.	D/OK
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	<p><i>more stringent sep 09 7498</i> <i>Don't include 141.531</i></p> <p>The supplier must collect TTHM and HAA5 samples that meet the routine sampling requirements specified in 25.1.3 and submit the results to the Department. Alternatively, the supplier may:</p>	8.2.10(c)(4)(ii) 2/36
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	<p><i>8.5.3a is clearly titled reporting req. for consultation with individual filter requirements.</i></p> <p>The supplier must submit all of the following information as part of the consultation process:</p>	8.4.1(a)(1) D/OK 8.5.3(a)

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141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	A description of the proposed change in disinfection practice.	D/04 8.5.3(a)(1)
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	The disinfection profile and benchmark for Giardia lamblia.	D/04 8.5.3(a)(2)
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	If required to be developed, the disinfection profile and benchmark for viruses.	D/04 8.5.3(a)(3)
141.57	This subpart T requires your system to report several items to the State. The following table describes the items which must be reported and the frequency of reporting. Your system is required to report the information described in the following table, if it is subject to the specific requirement shown in the first column.	An analysis of how the proposed change will affect the current levels of disinfection.	D/04 8.5.3(a)(4)

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141.571	Your system must keep several types of records based on the requirements of subpart T, in addition to recordkeeping requirements under §141.75. The following table describes the necessary records, the length of time these records must be kept, and for which requirement the records pertain. Your system is required to maintain records described in this table, if it is subject to the specific requirement shown in the first column.	36.4.2.2.1 - not correct! Individual filter monitoring must be done for 3 yrs	C137 LS
141.571	Your system must keep several types of records based on the requirements of subpart T, in addition to recordkeeping requirements under §141.75. The following table describes the necessary records, the length of time these records must be kept, and for which requirement the records pertain. Your system is required to maintain records described in this table, if it is subject to the specific requirement shown in the first column.	The supplier must maintain all of the following information indefinitely:	36.4.2(e)
141.571	Your system must keep several types of records based on the requirements of subpart T, in addition to recordkeeping requirements under §141.75. The following table describes the necessary records, the length of time these records must be kept, and for which requirement the records pertain. Your system is required to maintain records described in this table, if it is subject to the specific requirement shown in the first column.	NO ref in 8.4 where record keeping is found in 8.4.1	C138
141.571	Your system must keep several types of records based on the requirements of subpart T, in addition to recordkeeping requirements under §141.75. The following table describes the necessary records, the length of time these records must be kept, and for which requirement the records pertain. Your system is required to maintain records described in this table, if it is subject to the specific requirement shown in the first column.	The results of the disinfection profile, including raw data and analysis, specified in 8.4.	36.4.2(e)(1)
141.6	Your system must keep several types of records based on the requirements of subpart T, in addition to recordkeeping requirements under §141.75. The following table describes the necessary records, the length of time these records must be kept, and for which requirement the records pertain. Your system is required to maintain records described in this table, if it is subject to the specific requirement shown in the first column.	SP0 CCA and Above The results of the disinfection benchmark, including raw data and analysis, specified in 8.5.	C139 36.4.2(e)(2)

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ARTICLE 33-17

PUBLIC WATER SUPPLY SYSTEMS

Chapter

33-17-01 Public Water Supply Systems in North Dakota

CHAPTER 33-17-01

PUBLIC WATER SUPPLY SYSTEMS IN NORTH DAKOTA

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33-17-01-01. Responsibility. It is the responsibility of any supplier of water to comply within the meaning of this chapter pursuant to North Dakota Century Code chapter 61-28.1.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-02. Definitions. For the purpose of this chapter the following definitions shall apply:

1. "Action level" means the concentration of lead or copper in water specified in title 40, Code of Federal Regulations, part 141, subpart I, section 141.80(c), that determines, in some cases, the treatment requirements set forth under title 40, Code of Federal Regulations, part 141, subpart I, that a water system is required to complete.
2. "Bag filters" means pressure-driven separation devices that remove particulate matter larger than one micrometer using an engineered porous filtration media. They are typically constructed of a nonrigid, fabric filtration media housed in a pressure vessel in which the direction of flow is from the inside of the bag to the outside.
3. "Bank filtration" means a water treatment process that uses a well to recover surface water that has naturally infiltrated into ground water through a riverbed or riverbanks. Infiltration is typically enhanced by the hydraulic gradient imposed by a nearby pumping water supply or other wells.
4. "Best available technology" or "BAT" means the best technology, treatment techniques, or other means which the department finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration). For the purposes of setting maximum contaminant levels for synthetic organic chemicals, any best available technology must be at least as effective as granular activated carbon.
5. "Cartridge filters" means pressure-driven separation devices that remove particulate matter larger than one micrometer using an engineered porous filtration media. They are typically constructed as rigid or semirigid, self-supporting filter elements housed in pressure vessels in which flow is from the outside of the cartridge to the inside.
6. "Coagulation" means a process using coagulant chemicals and mixing by which colloidal and suspended materials are destabilized and agglomerated into flocs.
7. "Combined distribution system" means the interconnected distribution system consisting of the distribution systems of wholesale systems and of the consecutive systems that receive finished water.
8. "Community water system" means a public water system which serves at least fifteen service connections used by year-round residents or regularly serves at least twenty-five year-round residents.
9. "Compliance cycle" means the nine-year calendar year cycle during which public water systems must monitor for inorganic and organic chemicals excluding lead, copper, trihalomethanes, and unregulated contaminants. Each compliance cycle consists of three 3-year compliance periods. The first calendar year cycle begins January 1,

1993, and ends December 31, 2001; the second begins January 1, 2002, and ends December 31, 2010; and the third begins January 1, 2011, and ends December 31, 2019.

10. "Compliance period" means a three-year calendar year period within a compliance cycle during which public water systems must monitor for inorganic and organic chemicals excluding lead, copper, trihalomethanes, and unregulated contaminants. Each compliance cycle has three 3-year compliance periods. Within the first compliance cycle, the first compliance period runs from January 1, 1993, to December 31, 1995; the second from January 1, 1996, to December 31, 1998; and the third from January 1, 1999, to December 31, 2001.
11. "Composite correction program" or "CCP" means a systematic, comprehensive procedure for identifying, prioritizing, and remedying factors that limit water treatment plant performance as set forth in the United States environmental protection agency handbook entitled Optimizing Water Treatment Plant Performance Using The Composite Correction Program, EPA/625/6-91/027, 1998 edition. A composite correction program consists of two phases, a comprehensive performance evaluation and comprehensive technical assistance.
12. "Comprehensive performance evaluation" or "CPE" means a thorough review and analysis of a treatment plant's performance-based capabilities and associated administrative, operation, and maintenance practices. It is conducted to identify factors that may be adversely impacting a plant's capability to achieve compliance and emphasizes approaches that can be implemented without significant capital improvements. For purposes of compliance with title 40, Code of Federal Regulations, part 141, subpart P and subpart T, the comprehensive performance evaluation shall consist of at least the following components:
 - a. Assessment of plant performance;
 - b. Evaluation of major unit processes;
 - c. Identification and prioritization of performance limiting factors;
 - d. Assessment of the applicability of comprehensive technical assistance; and
 - e. Preparation of a comprehensive performance evaluation report.
13. "Comprehensive technical assistance" or "CTA" means the performance improvement phase of a composite correction program that is implemented if the comprehensive performance evaluation results indicate improved performance potential. During the comprehensive technical assistance phase, identified and prioritized

factors that limit water treatment plant performance are systematically addressed and eliminated.

14. "Confluent growth" means a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete.
15. "Consecutive system" means a public water system that receives some or all of its finished water from one or more wholesale systems. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.
16. "Contaminant" means any physical, chemical, biological, or radiological substance or matter in water.
17. "Conventional filtration treatment" means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal.
18. "Corrosion inhibitor" means a substance capable of reducing the corrosivity of water toward metal plumbing materials, especially lead and copper, by forming a protective film on the interior surface of those materials.
19. "Cross connection" means any connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other either water of unknown or questionable safety or steam, gas, or chemical whereby there may be a flow from one system to the other, the direction of flow depending on the pressure differential between the two systems.
20. "CT" or "CT calc" means the product of residual disinfectant concentration (C) in milligrams per liter determined before or at the first customer and the corresponding disinfectant contact time (T) in minutes. If disinfectants are applied, at more than one point prior to the first customer, the CT of each disinfectant sequence must be determined before or at the first customer to determine the total percent inactivation or total inactivation ratio. In determining the total inactivation ratio, the residual disinfectant concentration of each disinfection sequence and the corresponding contact time must be determined before any subsequent disinfection application points. CT ninety-nine point nine is the CT value required for ninety-nine point nine percent (three-logarithm) inactivation of giardia lamblia cysts. CT ninety-nine point nine values for a wide variety of disinfectants and conditions are set forth under title 40, Code of Federal Regulations, part 141, subpart H. CT calculated divided by CT ninety-nine point nine is the inactivation ratio. The total inactivation ratio is determined by adding together the inactivation ratio for each disinfection sequence. A total inactivation ratio equal to or greater than one point zero is

assumed to provide a three-logarithm inactivation of giardia lamblia cysts.

21. "Department" means the state department of health.
22. "Diatomaceous earth filtration" means a process resulting in substantial particulate removal in which a precoat cake of diatomaceous earth filter media is deposited on a support membrane or septum, and while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.
23. "Direct filtration" means a series of processes including coagulation and filtration but excluding sedimentation resulting in substantial particulate removal.
24. "Disinfectant" means any oxidant, including, but not limited to, chlorine, chlorine dioxide, chloramines, and ozone added to water in any part of the treatment or distribution process, that is intended to kill or inactivate pathogenic microorganisms.
25. "Disinfectant contact time" (T in CT calculations) means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration (C) is measured. Where only one C is measured, T is the time in minutes that it takes for water to move from the point of disinfectant application to a point before or at where C is measured. Where more than one C is measured, T, for the first measurement of C, is the time in minutes that it takes the water to move from the first or only point of disinfectant application to a point before or at the point where the first C is measured. For subsequent measurements of C, T is the time in minutes that it takes for water to move from the previous C measurement point to the C measurement point for which the particular T is being calculated. Disinfectant contact time in pipelines must be calculated by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. T within mixing basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.
26. "Disinfection" means a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.
27. "Disinfection profile" means a summary of daily giardia lamblia inactivation through the treatment plant. The disinfection profile shall be developed as set forth under title 40, Code of Federal Regulations, part 141, subpart P (141.172) and subpart T (141.530-141.536).
28. "Domestic or other nondistribution system plumbing problem" means a coliform contamination problem in a public water system with more than

one service connection that is limited to the specific service connection from which the coliform-positive sample was taken.

29. "Dual sample set" means a set of two samples collected at the same time and same location, with one sample analyzed for total trihalomethanes (TTHM) and the other sample analyzed for haloacetic acids five (HAA5). Dual sample sets are collected for the purpose of conducting an initial distribution system evaluation (IDSE) under title 40, Code of Federal Regulations, parts 141.600 to 141.605 inclusive, and determining compliance with the TTHM and HAA5 MCLs under title 40, Code of Federal Regulations, parts 141.620 to 141.629 inclusive.
30. "Effective corrosion inhibitor residual", for the purpose of title 40, Code of Federal Regulations, part 141, subpart I only, means a concentration sufficient to form a passivating film on the interior walls of pipe.
31. "Enhanced coagulation" means the addition of sufficient coagulant for improved removal of disinfection byproduct precursors by conventional filtration treatment.
32. "Enhanced softening" means the improved removal of disinfection byproduct precursors by precipitative softening.
33. "Filter profile" means a graphical representation of individual filter performance based on continuous turbidity measurements or total particle counts versus time for an entire filter run, from startup to backwash inclusively, that includes an assessment of filter performance while another filter is being backwashed.
34. "Filtration" means a process for removing particulate matter from water by passage through porous media.
35. "Finished water" means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except treatment necessary to maintain water quality in the distribution system (e.g., booster disinfection or addition of corrosion control chemicals).
36. "First draw sample" means a one-liter sample of tap water, collected in accordance with title 40, Code of Federal Regulations, part 141, section 141.86(b)(2), that has been standing in plumbing pipes at least six hours and is collected without flushing the tap.
37. "Flocculation" means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.
38. "Flowing stream" means a course of running water flowing in a definite channel.

39. "Granular activated carbon ten" or "GAC10" means granular activated carbon filter beds with an empty-bed contact time of ten minutes based on average daily flow and a carbon reactivation frequency of every one hundred eighty days, except that the reactivation frequency for GAC10 used as a best available technology for compliance with subpart V MCLs under title 40, Code of Federal Regulations, part 141.64(b)(2) shall be one hundred twenty days.
40. "Granular activated carbon twenty" or "GAC 20" means granular activated carbon filter beds with an empty-bed contact time of twenty minutes based on average daily flow and a carbon reactivation frequency of every two hundred forty days.
41. "Gross alpha particle activity" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample.
42. "Ground water under the direct influence of surface water" means any water beneath the surface of the ground with significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as giardia lamblia or cryptosporidium. Ground water under the direct influence of surface water also means significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions.
43. "Haloacetic acids five" or "HAA5" means the sum of the concentrations in milligrams per liter of the haloacetic acid compounds monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid, rounded to two significant figures after addition.
44. "Halogen" means one of the chemical elements chlorine, bromine, or iodine.
45. "Initial compliance period" means the first full compliance period that begins January 1, 1993, during which public water systems must monitor for inorganic and organic chemicals excluding lead, copper, trihalomethanes, and unregulated contaminants.
46. "Lake/reservoir" means a natural or manmade basin or hollow on the earth's surface in which water collects or is stored that may or may not have a current or single direction of flow.
47. "Large water system", for the purpose of title 40, Code of Federal Regulations, part 141, subpart I only, means a water system that serves more than fifty thousand persons.

48. "Lead service line" means a service line made of lead that connects the water main to the building inlet and any pigtail, gooseneck, or other fitting that is connected to a lead line.
49. "Legionella" means a genus of bacteria, some species of which have caused a type of pneumonia called legionnaires disease.
50. "Locational running annual average" or "LRAA" means the average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.
51. "Maximum contaminant level" means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.
52. "Maximum residual disinfectant level" or "MRDL" means a level of a disinfectant added for water treatment that must not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects.
53. "Maximum total trihalomethane potential" means the maximum concentration of total trihalomethanes produced in a given water containing a disinfectant residual after seven days at a temperature of twenty-five degrees Celsius [77 degrees Fahrenheit] or above.
54. "Medium-size water system", for the purpose of title 40, Code of Federal Regulations, part 141, subpart I only, means a water system that serves three thousand three hundred one to fifty thousand persons.
55. "Membrane filtration" means a pressure-driven or vacuum-driven separation process in which particulate matter larger than one micrometer is rejected by an engineered barrier, primarily through a size-exclusion mechanism, and which has a measurable removal efficiency of a target organism that can be verified through the application of a direct integrity test. This definition includes the common membrane technologies of microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.
56. "Near the first service connection" means at one of the twenty percent of all service connections in the entire system that are nearest the water supply treatment facility as measured by water transport time within the distribution system.
57. "Noncommunity water system" means a public water system that is not a community water system that primarily provides service to other than year-round residents. A noncommunity water system is either a "nontransient noncommunity" or "transient noncommunity" water system.

- 58. "Nontransient noncommunity water system" means a noncommunity water system that regularly serves at least twenty-five of the same persons over six months per year.
- 59. "Optimal corrosion-control treatment", for the purpose of title 40, Code of Federal Regulations, part 141, subpart I only, means the corrosion-control treatment that minimizes the lead and copper concentrations at users' taps while ensuring that the treatment does not cause the water system to violate any national primary drinking water regulations.
- 60. "Person" means an individual, corporation, company, association, partnership, municipality, or any other entity.
- 61. "Plant intake" means the works or structures at the head of a conduit through which water is diverted from a source (e.g., river or lake) into the treatment plant.
- 62. "Point of disinfectant application" means the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface water runoff.
- 63. "Point-of-entry treatment device" means a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.
- 64. "Point-of-use treatment device" means a treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water at that one tap.
- 65. "Potable water" means water free from impurities in amounts sufficient to cause disease or harmful physiological effects, with the physical, chemical, biological, or radiological quality conforming to applicable maximum permissible contaminant levels.
- 66. "Presedimentation" means a preliminary treatment process used to remove gravel, sand, and other particulate material from the source water through settling before the water enters the primary clarification and filtration processes in a treatment plant.
- 67. "Product" means any chemical or substance added to a public water system, any materials used in the manufacture of public water system components or appurtenances, or any pipe, storage tank, valve, fixture, or other materials that come in contact with water intended for use in a public water system.
- 68. "Public water system" means a system for the provision to the public of water for human consumption through pipes or other constructed

conveyances, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals sixty or more days out of the year. A public water system includes any collection, treatment, storage, and distribution facilities under control of the operator of the system and used primarily in connection with the system; and, any collection or pretreatment storage facilities that are not under control of the operator which are used primarily in connection with the system. A public water system does not include systems that provide water through pipes or constructed conveyances other than pipes that qualify for the exclusions set forth under section 1401(4)(B)(i) and (ii) of the Federal Safe Drinking Water Act [42 U.S.C. 300f(4)(B)(i) and (ii)]. A public water system is either a "community" or a "noncommunity" water system.

- 69. "Repeat compliance period" means any subsequent compliance period after the initial compliance period during which public water systems must monitor for inorganic and organic chemicals excluding lead, copper, trihalomethanes, and unregulated contaminants.
- 70. "Residual disinfectant concentration" (C in CT calculations) means the concentration of disinfectant measured in milligrams per liter in a representative sample of water.
- 71. "Sampling schedule" means the frequency required for submitting drinking water samples to a certified laboratory for examination.
- 72. "Sanitary survey" means an onsite review of the water source, facilities, equipment, operation, and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation, and maintenance for producing and distributing safe drinking water.
- 73. "Sedimentation" means a process for removal of solids before filtration by gravity or separation.
- 74. "Service line sample" means a one-liter sample of water, collected in accordance with title 40, Code of Federal Regulations, part 141, section 141.86(b)(3), that has been standing for at least six hours in a service line.
- 75. "Single-family structure", for the purpose of title 40, Code of Federal Regulations, part 141, subpart I only, means a building constructed as a single-family residence that is currently used either as a residence or a place of business.
- 76. "Slow sand filtration" means a process involving passage of raw water through a bed of sand at low velocity resulting in substantial particulate removal by physical and biological mechanisms.

77. "Small water system", for the purpose of title 40, Code of Federal Regulations, part 141, subpart I only, means a water system that serves three thousand three hundred or fewer persons.
78. "Specific ultraviolet absorption" or "SUVA" means specific ultraviolet absorption at two hundred fifty-four nanometers, an indicator of the humic content of water. It is a calculated parameter obtained by dividing a sample's ultraviolet absorption at a wavelength of two hundred fifty-four nanometers in meters to the minus one by its concentration of dissolved organic carbon, the fraction of the total organic carbon that passes through a zero point four five micrometer pore diameter filter, in milligrams per liter.
79. "Subpart H systems" means public water systems using surface water or ground water under the direct influence of surface water as a source that are subject to the requirements of title 40, Code of Federal Regulations, part 141, subpart H.
80. "Supplier of water" means any person who owns or operates a public water system.
81. "Surface water" means all water which is open to the atmosphere and subject to surface runoff.
82. "System with a single service connection" means a system which supplies drinking water to consumers with a single service line.
83. "Too numerous to count" means that the total number of bacterial colonies exceeds two hundred on a forty-seven millimeter membrane filter used for coliform detection.
84. "Total organic carbon" means total organic carbon in milligrams per liter measured using heat, oxygen, ultraviolet irradiation, chemical oxidants, or combinations of these oxidants that convert organic carbon to carbon dioxide, rounded to two significant figures.
85. "Total trihalomethanes" means the sum of the concentration in milligrams per liter of the trihalomethane compounds (trichloromethane [chloroform], dibromochloromethane, bromodichloromethane, and tribromomethane [bromoform]), rounded to two significant figures.
86. "Transient noncommunity water system" means a noncommunity water system that primarily provides service to transients.
87. "Trihalomethane" means one of the family of organic compounds, named as derivatives of methane, wherein three of the four hydrogen atoms in methane are each substituted by a halogen atom in the molecular structure.

88. "Two-stage line softening" means a process in which chemical addition and hardness precipitation occur in each of two distinct unit clarification processes in series prior to filtration.
89. "Uncovered finished water storage facility" means a tank, reservoir, or other facility used to store water that will undergo no further treatment except residual disinfection and is open to the atmosphere.
90. "Virus" means a virus of fecal origin which is infectious to humans by waterborne transmission.
91. "Water system" means all sources of water and their surroundings and includes all structures, conducts, and appurtenances by means of which the water is collected, treated, stored, or delivered.
92. "Waterborne disease outbreak" means the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the appropriate local or state agency.
93. "Wholesale system" means a public water system that treats source water as necessary to produce finished water and then delivers some or all of that finished water to another public water system. Delivery may be through a direct connection or through the distribution system of one or more consecutive systems.

History: Amended effective December 1, 1982; July 1, 1988; December 1, 1990; August 1, 1991; February 1, 1993; August 1, 1994; August 1, 2000; April 1, 2005; January 1, 2010.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-02, 61-28.1-03

33-17-01-03. Coverage. This chapter applies to all public water systems except those public water systems which meet all of the following conditions:

1. Consists only of distribution and storage facilities and does not have any collection and treatment facilities;
2. Obtains all of its water from a public water system to which these regulations apply;
3. Does not sell water to any person; and
4. Is not a carrier which conveys passengers in interstate commerce.

History: Amended effective July 1, 1988; February 1, 1993.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-04. Designated responsible individuals. The owner or operating entity of each public water system shall designate an individual, or individuals, who shall be responsible for communicating with the department in matters relating to system construction or alteration, monitoring and sampling, maintenance, operation, recordkeeping, and reporting required by these regulations. Any changes in designated individuals or assigned responsibilities shall be promptly reported to the department.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-05. Approved laboratories and analytical procedures. All samples shall be examined by the department or by any other laboratory certified by the department for drinking water purposes, except that measurements for turbidity and free chlorine may be performed by any person deemed qualified by the department. Turbidity measurements shall be made by a nephelometric method approved by the department. All methods of sample preservation and analyses shall be as prescribed by the department and set forth under title 40, Code of Federal Regulations, part 141.

History: Amended effective December 1, 1982; July 1, 1988; December 1, 1990; February 1, 1993; August 1, 2000.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03, 61-28.1-07

33-17-01-06. Maximum contaminant levels, action levels, and treatment technique requirements, and maximum residual disinfectant levels.

1. **Inorganic chemicals.** The maximum contaminant levels, action levels, and treatment technique requirements for inorganic chemical contaminants excluding disinfection byproducts shall be as prescribed by the department and set forth under title 40, Code of Federal Regulations, part 141, subpart G.

CONTAMINANT	MAXIMUM CONTAMINANT LEVEL MILLIGRAM(S) PER LITER	ACTION LEVEL MILLIGRAM(S) PER LITER	TREATMENT TECHNIQUES REQUIREMENTS
Antimony	0.006		
Arsenic	0.05 (until January 22, 2006) 0.010 (effective January 23, 2006)		
Asbestos	7 million fibers per liter (longer than ten micrometers)		
Barium	2		
Beryllium	0.004		
Cadmium	0.005		
Chromium	0.1		

Copper		The 90th percentile level must be less than or equal to 1.3	Source water and corrosion control treatment
Cyanide (as free cyanide)	0.2		
Fluoride	4.0		
Lead		The 90th percentile level must be less than or equal to 0.015	Source water and corrosion control treatment, public education, and lead service line replacement
Mercury	0.002		
Nickel	0.1		
Nitrate (as N)	10		
Nitrite (as N)	1		
Selenium	0.05		
Thallium	0.002		
Total Nitrate and Nitrite (as N)	10		

At the discretion of the department, nitrate levels not to exceed twenty milligrams per liter may be allowed in a noncommunity water system if the supplier of water demonstrates to the satisfaction of the department that:

- a. Such water will not be available to children under six months of age;
 - b. There will be continuous posting of the fact that nitrate levels exceed ten milligrams per liter and the potential health effect of exposure;
 - c. Local and state public health authorities will be notified annually of nitrate levels that exceed ten milligrams per liter; and
 - d. No adverse health effects shall result.
2. **Organic chemicals.** The maximum contaminant levels and treatment technique requirements for organic chemical contaminants excluding disinfection byproducts and disinfection byproduct precursors shall be as prescribed by the department and set forth under title 40, Code of Federal Regulations, part 141, subpart G.

CONTAMINANT	MAXIMUM CONTAMINANT LEVEL MILLIGRAM(S) PER LITER	ACTION LEVEL MILLIGRAM(S) PER LITER	TREATMENT TECHNIQUE REQUIREMENTS
Nonvolatile Synthetic Organic Chemicals:			
Acrylamide			The combination (or product) of dose and monomer level may not exceed 0.05 percent dosed at 1 part per million (or equivalent)
Alachlor	0.002		
Atrazine	0.003		
Benzo (a) pyrene	0.0002		
Carbofuran	0.04		
Chlordane	0.002		
Dalapon	0.2		
Dibromochloropropane (DBCP)	0.0002		
Di (2-ethylhexyl) adipate	0.4		
Di (2-ethylhexyl) phthalate	0.006		
Dinoseb	0.007		
Diquat	0.02		
Endothall	0.1		
Endrin	0.002		
Epichlorohydrin			The combination (or product) of dose and monomer level may not exceed 0.01 percent dosed at 20 parts per million (or equivalent)
Ethylene dibromide (EDB)	0.00005		
Glyphosate	0.7		
Heptachlor	0.0004		
Heptachlor epoxide	0.0002		
Hexachlorobenzene	0.001		
Hexachlorocyclopentadiene	0.05		
Lindane	0.0002		
Methoxychlor	0.04		
Oxamyl (Vydate)	0.2		
Polychlorinated biphenyls (PCBs)	0.0005		
Pentachlorophenol	0.001		
Picloram	0.5		
Simazine	0.004		
Toxaphene	0.003		
2,3,7,8-TCDD (Dioxin)	0.00000003		
2,4-D	0.07		
2,4,5-TP Silvex	0.05		
Volatile Synthetic Organic Chemicals:			

Benzene	0.005
Carbon tetrachloride	0.005
p-Dichlorobenzene	0.075
o-Dichlorobenzene	0.6
1,2-Dichloroethane	0.005
1,1-Dichloroethylene	0.007
cis-1,2-Dichloroethylene	0.07
trans-1,2-Dichloroethylene	0.1
Dichloromethane	0.005
1,2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
Styrene	0.1
Tetrachloroethylene	0.005
Toluene	1
1,2,4-Trichlorobenzene	0.07
1,1,1-Trichloroethane	0.2
1,1,2-Trichloroethane	0.005
Trichloroethylene	0.005
Vinyl chloride	0.002
Xylenes (total)	10

3. Filtration and disinfection treatment.

- a. General requirements. All subpart H systems that utilize surface water sources shall provide filtration and disinfection treatment. All subpart H systems that utilize ground water sources deemed by the department to be under the direct influence of surface water shall provide disinfection treatment and shall either comply with filtration avoidance criteria or provide filtration treatment.
- b. Treatment technique requirements. The department hereby identifies filtration and disinfection as treatment techniques to protect against the potential adverse health effects of exposure to giardia lamblia, cryptosporidium, legionella, viruses, heterotrophic plate count bacteria, and turbidity. The treatment techniques apply only to subpart H systems. Subpart H systems that serve ten thousand or more persons shall be deemed to be in compliance with the treatment techniques if the requirements set forth under title 40, Code of Federal Regulations, part 141, subparts H and P, are met. Subpart H systems that serve fewer than ten thousand persons shall be deemed to be in compliance with the treatment techniques if the requirements set forth under title 40, Code of Federal Regulations, part 141, subpart H, are met.

4. **Radioactivity.** The maximum contaminant levels for radioactivity are as follows:

CONTAMINANT	MAXIMUM CONTAMINANT LEVEL (MCL)
Combined radium-226 and radium-228	5 picocuries per liter (pCi/L)
Gross alpha particle activity (including radium-226, but excluding radon and uranium)	15 picocuries per liter (pCi/L)
Uranium	30 micrograms per liter (ug/L)

5. **Microbiological.** The maximum contaminant levels for coliform bacteria are as follows:

a. Monthly maximum contaminant level violations.

- (1) No more than one sample per month may be total coliform-positive for systems collecting less than forty samples per month.
- (2) No more than five point zero percent of the monthly samples may be total coliform-positive for systems collecting forty or more samples per month.

All routine and repeat total coliform samples must be used to determine compliance. Special purpose samples, such as those taken to determine whether disinfection practices following pipe placement, replacement, or repair are sufficient, and samples invalidated by the department, may not be used to determine compliance.

b. Acute maximum contaminant level violations.

- (1) No repeat sample may be fecal coliform or E. coli-positive.
- (2) No repeat sample may be total coliform-positive following a fecal coliform or E. coli-positive routine sample.

c. Compliance must be determined each month that a system is required to monitor. The department hereby identifies the following as the best technology, treatment techniques, or other means generally available for achieving compliance with the maximum contaminant levels for total coliform bacteria: protection of wells from contamination by appropriate placement and construction; maintenance of a disinfection residual throughout the distribution system; proper maintenance of the distribution system including appropriate pipe replacement and repair

procedures, cross-connection control programs, main flushing programs, proper operation and maintenance of storage tanks and reservoirs, and continual maintenance of a positive water pressure in all parts of the distribution system; filtration and disinfection or disinfection of surface water and disinfection of ground water using strong oxidants such as chlorine, chlorine dioxide, or ozone; and the development and implementation of a department-approved wellhead protection program.

6. **Disinfectants.** The maximum residual disinfectant levels for disinfectants are as follows:

DISINFECTANT	MAXIMUM RESIDUAL DISINFECTANT LEVEL IN MILLIGRAMS PER LITER
Chlorine	4.0 as free chlorine
Chloramines	4.0 as combined chlorine
Chlorine dioxide	0.8 as chlorine dioxide

The department identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum residual disinfectant levels: control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.

7. **Disinfection byproducts.** The maximum contaminant levels for total trihalomethanes, haloacetic acids five, bromate, and chlorite are as follows:

DISINFECTION BYPRODUCT	MAXIMUM CONTAMINANT LEVEL IN MILLIGRAMS PER LITER
Total trihalomethanes	0.080
Haloacetic acids five	0.060
Bromate	0.010
Chlorite	1.0

The department identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum contaminant level for total trihalomethanes and the maximum contaminant levels for haloacetic acids five, bromate, and chlorite: for total trihalomethanes and haloacetic acids five, enhanced coagulation, enhanced softening, or granular activated carbon ten with chlorine as the primary and residual disinfectant; for bromate, control of the ozone treatment process to reduce production of bromate; and for chlorite, control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce

disinfectant levels. All best available technology and compliance shall be prescribed by the department and set forth under title 40, Code of Federal Regulations, part 141.64.

8. **Disinfection byproduct precursors.** The department hereby identifies enhanced coagulation and enhanced softening as treatment techniques to control the level of disinfection byproduct precursors in drinking water treatment and distribution systems. The treatment techniques apply only to subpart H community and nontransient noncommunity water systems that use conventional treatment. Such systems shall be deemed to be in compliance with the treatment techniques if the requirements set forth under title 40, Code of Federal Regulations, part 141, subpart L, are met.
9. **Confirmation sampling.** The department may require confirmation samples and average confirmation sample results with initial sample results to determine compliance. At the discretion of the department, sample results due to obvious monitoring errors may be deleted prior to determining compliance.

History: Amended effective December 1, 1982; July 1, 1988; December 1, 1990; February 1, 1993; August 1, 1994; August 1, 2000; December 1, 2003; April 1, 2005; January 1, 2010.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-07. Inorganic chemical sampling and monitoring requirements.

1. Sampling frequency for community and nontransient noncommunity water systems.
 - a. Inorganics excluding lead and copper. Community and nontransient noncommunity water systems shall conduct monitoring to determine compliance with the maximum contaminant levels for the inorganic chemicals, excluding lead and copper, as set forth under title 40, Code of Federal Regulations, part 141, subpart C.
 - b. Lead and copper. Community and nontransient noncommunity water systems shall comply with the monitoring and treatment technique requirements for lead and copper set forth under title 40, Code of Federal Regulations, part 141, subpart I, as amended July 1, 2009.
 - c. Unregulated contaminants. Community and nontransient noncommunity water systems shall monitor for sulfate as set forth under title 40, Code of Federal Regulations, part 141, subpart E.

- d. **Monitoring waivers.** With the exception of arsenic, copper, lead, nitrate, and nitrite, the department may grant community and nontransient noncommunity water systems waivers from the monitoring requirements for the inorganic chemicals as set forth under title 40, Code of Federal Regulations, part 141, subparts C and E. The department may issue monitoring waivers only if the conditions set forth under title 40, Code of Federal Regulations, part 142, subpart B, are fully met.
2. **Sampling frequency for transient noncommunity water systems.** Transient noncommunity water systems shall conduct monitoring to determine compliance with the maximum contaminant levels for nitrate and nitrite as set forth under title 40, Code of Federal Regulations, part 141, subpart C.

History: Amended effective July 1, 1988; February 1, 1993; August 1, 1994; August 1, 2000; July 1, 2011.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-08. Organic chemical sampling and monitoring requirements.

1. **Volatile and nonvolatile synthetic organic chemicals.**
 - a. **Coverage.** Community and nontransient noncommunity water systems shall conduct monitoring to determine compliance with the maximum contaminant levels for the volatile and nonvolatile synthetic organic chemicals.
 - b. **Sampling frequency.** The number and frequency of samples shall be as prescribed by the department and set forth under title 40, Code of Federal Regulations, part 141, subpart C.
 - c. **Compliance.** Compliance for each point that is sampled shall be prescribed by the department and set forth under title 40, Code of Federal Regulations, part 141, subpart C.
2. **Unregulated contaminants.**
 - a. **Coverage.** Community and nontransient noncommunity water systems shall monitor for unregulated organic contaminants.
 - b. **Monitoring requirements.** Systems shall monitor for unregulated organic contaminants as set forth under title 40, Code of Federal Regulations, part 141, subpart E.
3. **Monitoring waivers.** With the exception of acrylamide and epichlorohydrin, the department may grant community and nontransient noncommunity water systems waivers from the

monitoring requirements for the organic chemicals as set forth under title 40, Code of Federal Regulations, part 141, subpart C. The department may issue waivers only if the conditions set forth under title 40, Code of Federal Regulations, part 142, subpart B, are fully met.

History: Amended effective December 1, 1982; July 1, 1988; December 1, 1990; August 1, 1994; August 1, 2000; April 1, 2005.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-08.1. Disinfectants, disinfectant residuals, disinfection byproducts, and disinfection byproduct precursors. Public water systems shall conduct monitoring to determine compliance with maximum contaminant levels, maximum residual disinfectant levels, and treatment technique requirements for disinfectants, disinfection residuals, disinfection byproducts, and disinfection byproduct precursors as set forth under title 40, Code of Federal Regulations, part 141, subparts L and V. Public water systems shall also comply with the requirements for conducting an initial distribution system evaluation as set forth under title 40, Code of Federal Regulations, part 141, subpart U.

History: Effective August 1, 2000; amended effective January 1, 2010.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-09. Filtration and disinfection treatment sampling and monitoring requirements.

1. Coverage. All subpart H systems shall conduct monitoring to determine compliance with the treatment technique requirements for filtration and disinfection.
2. Systems utilizing surface water sources. All subpart H systems that utilize surface water sources shall comply with the turbidity and residual disinfectant concentration sampling and monitoring requirements set forth under title 40, Code of Federal Regulations, part 141, subpart H. Those systems serving ten thousand or more persons shall also comply with the disinfection profiling and benchmarking requirements set forth under title 40, Code of Federal Regulations, part 141, subpart P. Beginning January 1, 2002, those systems that serve ten thousand or more persons and provide conventional filtration treatment or direct filtration shall also comply with the individual filter sampling and monitoring requirements set forth under title 40, Code of Federal Regulations, part 141, subpart P. Those systems serving fewer than ten thousand persons shall also comply with the requirements set forth under title 40, Code of Federal Regulations, part 141, subpart T and the Federal Register volume 69, number 124, Tuesday, June 29, 2004, pages 38850-38857.

3. Systems utilizing ground water sources under the direct influence of surface water. The following sampling and monitoring requirements apply to subpart H systems that utilize ground water sources deemed by the department to be under the direct influence of surface water:
 - a. All systems that provide filtration treatment shall comply with the turbidity and residual disinfectant concentration sampling and monitoring requirements set forth under title 40, Code of Federal Regulations, part 141, subpart H. Those systems serving ten thousand or more persons shall also comply with the disinfection profiling and benchmarking requirements set forth under title 40, Code of Federal Regulations, part 141, subpart P. Beginning January 1, 2002, those systems that serve ten thousand or more persons and provide conventional filtration treatment or direct filtration shall also comply with the individual filter sampling and monitoring requirements set forth under title 40, Code of Federal Regulations, part 141, subpart P. Those systems serving fewer than ten thousand persons shall also comply with the requirements set forth under title 40, Code of Federal Regulations, part 141, subpart T and the Federal Register volume 69, number 124, Tuesday, June 29, 2004, pages 38850-38857.
 - b. All systems that do not provide filtration treatment shall comply with the filtration avoidance criteria and applicable disinfection sampling and monitoring requirements set forth under title 40, Code of Federal Regulations, part 141, subpart H. Those systems serving ten thousand or more persons shall also comply with the disinfection profiling and benchmarking requirements and, beginning January 1, 2002, the filtration avoidance criteria set forth under title 40, Code of Federal Regulations, part 141, subpart P. Those systems serving fewer than ten thousand persons shall also comply with the requirements set forth under title 40, Code of Federal Regulations, part 141, subpart T and the Federal Register volume 69, number 124, Tuesday, June 29, 2004, pages 38850-38857.
4. Recycle provisions. All subpart H systems that utilize conventional filtration or direct filtration treatment and that recycle spent filter backwash water, thickener supernatant, or liquids from dewatering processes must meet the requirements as prescribed by the department and set forth under title 40, Code of Federal Regulations, part 141.76, subpart H.
5. Enhanced treatment for cryptosporidium. All public water systems that utilize a surface water source or a ground water source under the direct influence of surface water shall meet the treatment technique requirements for cryptosporidium set forth under title 40, Code of Federal Regulations, part 141, subpart W. These requirements are in

addition to requirements found in title 40, Code of Federal Regulations, part 141, subparts H, P, and T.

History: Amended effective December 1, 1982; July 1, 1988; February 1, 1993; August 1, 2000; December 1, 2003; April 1, 2005; January 1, 2010.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-10. Radioactivity monitoring and compliance. Community water systems shall sample for gross alpha particle activity, radium-226, radium-228, and uranium. Monitoring frequency and compliance shall be as prescribed by the department and set forth under title 40, Code of Federal Regulations, parts 141.26 and 141.66.

History: Amended effective July 1, 1988; December 1, 2003.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-11. Microbiological sampling and monitoring requirements.

1. Routine monitoring.

- a. General. Suppliers of water for public water systems shall collect routine samples for total coliform bacteria analysis at sites which are representative of the water throughout the distribution system according to a written sample siting plan. The plan is subject to department review and revision.

The routine samples must be collected at regular time intervals throughout the month except that systems using ground water not under the direct influence of surface water, as determined by the department, serving four thousand nine hundred people or less may collect all of the required samples on a single day if the samples are collected from different sites.

At the discretion of the department, systems that use surface water or ground water under the direct influence of surface water that do not filter in compliance with title 40, Code of Federal Regulations, part 141, subpart H, shall collect at least one sample for total coliform bacteria analysis each day that the turbidity level of the source water exceeds one nephelometric turbidity unit. The sample must be collected near the first service connection within twenty-four hours of the first exceedance unless the department determines that the system, due to logistical or other problems beyond its control, cannot have the sample analyzed within thirty hours of collection. The sample results must be included in determining compliance with the maximum contaminant levels for total coliform bacteria.

- b. Community water systems. Suppliers of water for community water systems shall sample for total coliform bacteria at a frequency established by the department. The number of samples required must be determined by the population served by the system and in no event may the frequency be less than that set forth below. The population range of twenty-five to one thousand includes public water systems which have at least fifteen service connections but that serve less than twenty-five persons.

POPULATION SERVED	MINIMUM NUMBER OF SAMPLES PER MONTH
25 to 1,000	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100

Community water systems using a ground water source serving twenty-five to one thousand persons may, with written permission from the department, reduce this sampling frequency to one sample per quarter provided that:

- (1) The system has no history of total coliform contamination in its current configuration; and

- (2) A sanitary survey conducted by the department in the past five years shows that the system is supplied solely by a protected ground water source that is free of sanitary defects.

c. Noncommunity water systems. Suppliers of water for noncommunity water systems using only ground water, and not ground water under the direct influence of surface water, serving one thousand people or less shall sample for total coliform bacteria in each calendar quarter that the system provides water to the public. The department may, in writing, reduce this routine monitoring frequency to no less than once per year based on sanitary survey results, accumulated analytical data, or the existence of additional safeguards such as a protective and enforced well code, disinfection, or an approved wellhead protection program. The frequency must be confirmed or changed based on subsequent sanitary surveys or data. The frequency may not be reduced until:

- (1) A sanitary survey conducted by the department shows that the system is free of sanitary defects; and
- (2) The system has performed at least one total coliform bacteria analysis of its drinking water and is in compliance with the microbiological maximum contaminant levels.

Suppliers of water for noncommunity water systems using only ground water, and not ground water under the direct influence of surface water, serving more than one thousand people during any month, shall sample for total coliform bacteria at the same frequency as like-sized community water systems. With written permission from the department, noncommunity water systems may reduce this monitoring frequency for any quarter that one thousand people or less are served. The reduced frequency must be one total coliform bacteria sample in each calendar quarter that water is provided to the public.

Suppliers of water for noncommunity water systems using ground water under the direct influence of surface water shall sample for total coliform bacteria at the same frequency as like-sized community water systems. Monitoring must begin within six months after the department determines that the ground water is under the direct influence of surface water.

Suppliers of water for noncommunity water systems using surface water, in total or in part, shall sample for total coliform bacteria at the same frequency as like-sized community water systems regardless of the number of people served.

2. Repeat monitoring.

- a. General. Suppliers of water for public water systems shall collect a set of repeat samples for total coliform bacteria analysis for each total coliform-positive routine sample.

Systems which collect more than one routine sample per month shall collect at least three repeat samples for each routine sample that is total coliform-positive. Systems which collect one routine sample per month or less shall collect at least four repeat samples for each routine sample that is total coliform-positive.

Systems may, with the approval of the department, count routine samples as repeat samples rather than routine samples provided that:

- (1) The routine samples are collected within five service connections of the initial total coliform-positive sample; and
 - (2) The routine samples are collected before the system learns that the initial sample was total coliform-positive.
- b. Repeat monitoring time period. The required set of repeat samples must be collected within twenty-four hours of notification by the department of the total coliform-positive result. The department may specify a longer time limit if it determines that the system cannot collect the repeat samples within twenty-four hours due to logistical or other problems beyond its control.

The repeat samples must be collected on the same day except that the department may allow systems with a single service connection to:

- (1) Collect the required set of repeat samples over a four-day period; or
 - (2) Collect a larger volume repeat sample in one or more sample containers of any size as long as the total volume collected is at least four hundred milliliters for systems that collect one or less routine sample per month and three hundred milliliters for systems that collect more than one routine sample per month.
- c. Repeat monitoring location. The repeat samples must be collected at the following locations:
 - (1) At least one repeat sample must be collected from the original sampling tap that was total coliform-positive.

- (2) At least one repeat sample must be collected from a tap within five service connections upstream of the original total coliform-positive sampling tap.
- (3) At least one repeat sample must be collected from a tap within five service connections downstream of the original total coliform-positive sampling tap.
- (4) Systems required to collect four repeat samples shall collect the fourth repeat sample within five service connections upstream or downstream of the original total coliform-positive sampling tap.

The department may waive the requirement to collect at least one repeat sample upstream and downstream of the original total coliform-positive sampling site and specify alternate sampling locations if the original sampling site is at or one away from the end of the distribution system.

- d. Additional sets of repeat samples. If one or more samples in the set of required repeat samples is total coliform-positive, an additional set of repeat samples must be collected meeting the same time and location requirements as for the original set of repeat samples.

Additional sets of repeat samples must be collected until no total coliform bacteria are detected in one complete set or the department determines that the maximum contaminant level for total coliform bacteria has been exceeded. The supplier of water shall report to the department and notify the public when a maximum contaminant level is exceeded.

- 3. **Next-month samples.** Suppliers of water for public water systems that collect four or fewer routine samples per month that have one or more total coliform-positive routine or repeat samples shall collect at least five routine samples the next month that water is provided to the public. The department may waive this requirement only if one of the following conditions is met:

- a. The department or an agent approved by the department, but not an employee of the system, conducts an onsite visit before the end of the next month that the system serves water to the public and determines that additional monitoring or corrective action is not warranted.
- b. The department, in a written decision made available to the public, determines why total coliform-positive samples occurred and establishes that the system has corrected or will correct the problem before the end of the next month that water is served to the public.

- c. The department invalidates the original total coliform-positive routine sample.

Routine total coliform bacteria samples normally collected the next month that water is provided to the public may be counted towards the set of five routine samples required the next month.

- 4. **Fecal coliform or E. coli analysis.** Suppliers of water for public water systems shall analyze each total coliform-positive routine or repeat sample for either fecal coliform bacteria or E. coli.

Systems shall notify the department by the end of the business day, or by the end of the next business day if the department offices are closed, once notified of a positive fecal coliform bacteria or E. coli result.

- 5. **Invalidation of total coliform samples.**

- a. Invalidation by the department. The department may invalidate a total coliform-positive sample only if one of the following conditions is met:
 - (1) The laboratory establishes that the total coliform-positive result was caused by improper sample analysis.
 - (2) The department determines, based upon the results of the required repeat samples, that the total coliform-positive sample resulted from a domestic or other nondistribution system problem. This provision applies only to systems that have more than one service connection and only if:
 - (a) All repeat samples collected at the same tap as the original total coliform-positive sample are also total coliform-positive; and
 - (b) All repeat samples collected within five service connections of the original total coliform-positive sample tap are total coliform-negative.
 - (3) The department, in a written decision made available to the public, determines that substantial grounds exist to indicate that the coliform-positive result was due to a circumstance or condition not reflective of the water quality in the distribution system. Invalidation must be based on the absence of total coliform-positive repeat samples and other factors as determined by the department. Invalidation may not be based solely on the grounds that all required repeat samples are total coliform-negative.

Total coliform-positive samples invalidated by the department may not count towards meeting the minimum monitoring requirements. Department invalidation of a total coliform-positive sample nullifies subsequent fecal coliform or E. coli results for the same sample.

- b. Invalidation by the laboratory. All total coliform bacteria samples examined by the department or by any other laboratory certified by the department must be invalidated, unless total coliform bacteria are detected, if:
 - (1) The sample produces a turbid culture in the absence of gas production using an analytical technique where gas formation is examined;
 - (2) The sample produces a turbid culture in the absence of an acid reaction in the presence-absence coliform test; or
 - (3) The sample exhibits confluent growth or produces colonies too numerous to count with an analytical technique using a membrane filter.

Suppliers of water for public water systems shall collect a replacement sample for total coliform bacteria analysis from the same location as the original sample if the original sample is invalidated by the department or any other laboratory certified by the department. Replacement samples must be collected within twenty-four hours of notification by the department and submitted for analysis until a valid result is obtained. The department may waive the twenty-four-hour time limit on a case-by-case basis.

6. **Sanitary surveys.**

- a. Coverage and effective dates. Community and noncommunity water systems that collect four or less routine total coliform bacteria samples per month shall undergo an initial sanitary survey by June 29, 1994, and June 29, 1999, respectively.
- b. Repeat frequency. Community and noncommunity water systems shall undergo an additional sanitary survey every five years following the initial sanitary survey, ~~except that noncommunity water systems using only protected and disinfected ground water, as determined by the department, shall undergo subsequent sanitary surveys at least every ten years following the initial sanitary survey.~~
- c. Responsibilities. Sanitary surveys must be performed by the department or an agent approved by the department. Information collected on sources of contamination within a delineated wellhead protection area during the development and implementation of

an approved wellhead protection program, if available, must be considered when conducting sanitary surveys.

The department shall review the sanitary survey results to determine if increased monitoring for total coliform bacteria or other measures are needed to protect or improve drinking water quality.

Community and noncommunity water systems are responsible for ensuring that the required sanitary surveys are conducted.

History: Amended effective December 1, 1982; July 1, 1988; December 1, 1990; August 1, 1991.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-12. Monitoring of consecutive public water systems. When a public water system supplies water to one or more other public water systems, the department may modify the monitoring requirements imposed to the extent that the interconnection of the systems justifies treating them as a single system for monitoring purposes. Any modified monitoring shall be conducted pursuant to a schedule specified by the department.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-13. Public notification. All public water systems are required to notify the public they serve when they fail to comply with the requirements of the national primary drinking water regulations (NPDWRs), fail to comply with the requirements of any schedule prescribed pursuant to a variance or exemption, or incur other situations posing a risk to public health. Owners and operators must follow the form, manner, frequency, and content of a public notice as prescribed by the department and set forth under title 40, Code of Federal Regulations, part 141, subpart Q, as amended July 1, 2009.

History: Amended effective December 1, 1982; July 1, 1988; December 1, 1990; August 1, 1991; February 1, 1993; August 1, 1994; August 1, 2000; December 1, 2003; July 1, 2011.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03, 61-28.1-05

33-17-01-13.1. Consumer confidence reports.

1. **Coverage and general requirements.** Community water systems shall deliver an annual consumer confidence report to all billing units or service connections provided drinking water by the system. The report shall contain information on the quality of the drinking water delivered by the system and characterize risks from exposure to contaminants detected in the drinking water. For the purpose of the report, detected

means at or above the levels set forth under title 40, Code of Federal Regulations, part 141, subpart O; as amended July 1, 2009.

2. **Effective dates.** Existing community water systems shall deliver annual reports by July first of each year. Annual reports shall contain information collected by December thirty-first of the previous calendar year.

New community water systems shall deliver the first report by July first of the year after its first full calendar year in operation and subsequent reports by July first of each year. Community water systems that sell water to other community water systems shall provide applicable information to the buyer systems as set forth under title 40, Code of Federal Regulations, part 141, subpart O, as amended July 1, 2009.

3. **Content.** Each report shall contain the information set forth under title 40, Code of Federal Regulations, subpart O, as amended July 1, 2009.
4. **Report delivery.** Community water systems shall comply with the report delivery requirements set forth under title 40, Code of Federal Regulations, subpart O, as amended July 1, 2009.

History: Effective August 1, 2000; amended effective July 1, 2011.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-14. Reporting and recordkeeping requirements.

1. **Reporting requirements.** Except when a shorter reporting period is specified, the system shall report to the department the result of any test, measurement, or analysis required within the first ten days following the month in which the results are received or the first ten days following the end of the required monitoring period as stipulated by the department, whichever of these is shorter.

The system shall notify the department within forty-eight hours of the failure to comply with any primary drinking water regulations including failure to comply with monitoring requirements, except that failure to comply with the maximum contaminant levels for total coliform bacteria must be reported to the department no later than the end of the next business day after the system learns of the violation.

Community water systems required to comply with title 40, Code of Federal Regulations, part 141, subpart G shall report the results of all analyses to the department within thirty days of the system's receipt of the results. Subpart H systems shall comply with the reporting requirements for filtration and disinfection treatment set forth under title 40, Code of Federal Regulations, part 141, subparts H, P, T,

and W. Community and nontransient noncommunity water systems shall comply with the reporting requirements for lead and copper set forth under title 40, Code of Federal Regulations, part 141, subpart I. Community, nontransient noncommunity, and transient noncommunity water systems shall comply with the applicable reporting requirements for disinfectants, disinfection byproducts, and disinfection byproduct precursors set forth under title 40, Code of Federal Regulations, part 141, subparts L, U, and V.

The system is not required to report analytical results to the department in cases when the department performed the analysis.

Within ten days of completing the public notification requirements set forth under title 40, Code of Federal Regulations, part 141, subpart Q for the initial public notice and any repeat notices, public water systems must submit to the department a certification that the system has fully complied with the public notification regulations. The public water system must include with this certification a representative copy of each type of notice distributed, published, posted, and made available to persons served by the system and to the media.

The system shall submit to the department, within the time stated in the request, copies of any records required to be maintained by the department or copies of any documents then in existence which the department is entitled to inspect under the provisions of state law.

2. **Recordkeeping requirements.** Subpart H systems shall comply with the recordkeeping requirements for filtration and disinfection treatment set forth under title 40, Code of Federal Regulations, part 141, subparts H, P, T, and W. Community and nontransient noncommunity water systems shall comply with the recordkeeping requirements for lead and copper set forth under title 40, Code of Federal Regulations, part 141, subpart I. Community, nontransient noncommunity, and transient noncommunity water systems shall comply with the applicable recordkeeping requirements for disinfectants, disinfection byproducts, and disinfection byproduct precursors set forth under title 40, Code of Federal Regulations, part 141, subparts L, U, and V. Community water systems shall retain copies of consumer confidence reports for no less than three years.

All public water systems shall retain on their premises or at a convenient location near their premises, the following additional records to document compliance with the remaining provisions of this chapter:

- a. **Bacteriological and chemical analyses.** Records of bacteriological analyses and turbidity analyses shall be kept for not less than five years. Records of chemical analyses shall be kept for not less than ten years. Actual laboratory reports may be kept, or data may

be transferred to tabular summaries, provided that the following information is included:

- (1) The date, place, and time of sampling and the name of the person who collected the sample;
 - (2) Identification of the sample as to whether it was a routine distribution system sample, check sample, or raw or other special purpose sample;
 - (3) Date of analysis;
 - (4) Laboratory and person responsible for performing analysis;
 - (5) The analytical technique or method used; and
 - (6) The result of the analysis.
- b. Corrective actions taken. Records of action taken by the system to correct violations shall be kept for a period of not less than three years after the last action taken with respect to the particular violation involved.
- c. Reports and communications. Copies of any written reports, summaries, or communications relating to sanitary surveys of the system conducted by the system itself, by a private consultant, or by any local, state, or federal agency, shall be kept for a period not less than ten years after completion of the sanitary survey involved.
- d. Variances and exemptions. Records concerning a variance or exemption granted to the system shall be kept for a period ending not less than five years following the expiration of such variance or exemption.
- e. Public notices and certifications. Copies of public notices issued pursuant to title 40, Code of Federal Regulations, part 141, subpart Q and certifications made to the department pursuant to title 40, Code of Federal Regulations, part 141.31 must be kept for three years after issuance.
- f. Copies of monitoring plans developed pursuant to this part shall be kept for the same period of time as the records of analyses taken

under the plan are required to be kept under subdivision a, except as specified elsewhere in this part.

History: Amended effective July 1, 1988; December 1, 1990; February 1, 1993; August 1, 2000; December 1, 2003; April 1, 2005; January 1, 2010.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03, 61-28.1-05

33-17-01-15. Variances and exemptions.

1. **General authority and limitations.** The department may grant a variance to a public water system from any maximum contaminant level or treatment technique requirement except the maximum contaminant level for coliform bacteria and the treatment technique requirements for filtration and disinfection set forth under title 40, Code of Federal Regulations, part 141, subpart H. The department may grant an exemption to a public water system from any maximum contaminant level or treatment technique requirement except the maximum contaminant level for coliform bacteria and the disinfection treatment requirements set forth under title 40, Code of Federal Regulations, part 141, subpart H, section 141.72(a)(3) and (b)(2).
2. **Variances.** Variances for public water systems serving ten thousand or more persons shall comply with section 1415(a) of the Federal Safe Drinking Water Act [42 U.S.C. 300g-4(a)]. Variances for public water systems serving fewer than ten thousand persons shall comply with one of the following: section 1415(a) of the Federal Safe Drinking Water Act [42 U.S.C. 300g-4(a)]; or section 1415(e) of the Federal Safe Drinking Water Act [42 U.S.C. 300g-4(e)] and title 40, Code of Federal Regulations, part 142, subpart K.

In granting variances pursuant to section 1415(a) of the Federal Safe Drinking Water Act [42 U.S.C. 300g-4(a)], the department identifies as best technology, treatment techniques, or other means generally available for achieving compliance with the maximum contaminant levels and treatment technique requirements those set forth under title 40, Code of Federal Regulations, part 142, subpart G. In granting variances pursuant to section 1415(e) of the Federal Safe Drinking Water Act [42 U.S.C. 300g-4(e)], the department identifies as acceptable technologies those established under section 1412(b)(15) of the Federal Safe Drinking Water Act [42 U.S.C. 300g-1(b)(15)].

3. **Exemptions.** Exemptions for public water systems shall comply with section 1416 of the Federal Safe Drinking Water Act [42 U.S.C. 300g-5] and title 40, Code of Federal Regulations, part 142, subpart G.
4. **Procedures.** Actions to consider a variance or exemption may be initiated by the department or by a public water system through a written request to the department. The department shall act on any

written variance or exemption request submitted by a public water system within ninety days receipt of the request. The department shall provide notice and opportunity for a public hearing before granting any variance and before prescribing a compliance schedule for any variance or exemption.

History: Amended effective December 1, 1982; July 1, 1988; December 1, 1990; August 1, 1991; February 1, 1993; August 1, 2000.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03, 61-28.1-05

33-17-01-16. Siting. All new, altered, or expanded public water systems including wells and treatment and storage facilities necessary for the continuous operation of the system shall be located so as to:

1. Minimize potential breakdown as a result of floods, fires, or other disasters;
2. Except for intake structures, not be within the floodplain of a one hundred year flood;
3. Prevent contamination of the water supply by existing sources of pollution; and
4. Provide sufficient property for water supply facilities to allow proper operation, maintenance, replacement, and storage of system components.

History: Amended effective December 1, 1982; July 1, 1988.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-04

33-17-01-17. Plans and specifications.

1. **Submission of plans.** Plans and specifications shall be prepared for all new public water systems and for alterations or extensions to existing systems. Such plans and specifications, together with other pertinent information, shall be submitted to the department for review and approval prior to awarding of contracts. Such plans and specifications shall:
 - a. Be submitted in triplicate and in sufficient time to permit at least a two-week period for review and comment and with additional time to incorporate changes, if required;
 - b. Be presented in legible form and of sufficient scale to facilitate review;

- c. Include supplemental information pertaining to basis of design, description of existing facilities, appraisal of future needs and such other information normally included in an engineer's report, as may be requested by the department; and
 - d. Be replaced by "as-built" plans when change orders result in major changes in the facilities.
- 2. **Submission of revised plans, change orders, and addendums.** Any deviation from the approved plans and specifications, or use of alternate equipment, which would affect capacity, hydraulic conditions, operating units, the functioning of the water treatment process or distribution system, or the quality of water to be delivered will require department approval prior to contract for alternate equipment or any construction which is affected by such change. Revised plans and specifications, change orders, or addendums, along with pertinent supplemental information, are to be submitted to the department for review and approval.
- 3. **Approval of plans.** Plans and specifications reviewed by the department will be approved only when such plans and specifications fully meet and comply with existing statutes and such standards and guidelines as have been or may be established by the department.
- 4. **Compliance with plan approval.** Systems shall be constructed in accordance with the plans, specifications, and applicable change orders approved by the department. The department reserves the right to remove from service all or any part of a system found not to be constructed in accordance with approved plans, specifications, or change orders, or for which plans, specifications, or change orders were not approved.
- 5. **Operation and maintenance manual.** An operation and maintenance manual shall be prepared and supplied by the appropriate party to new or modified water supply facilities or systems. A copy of this manual shall be submitted to the department for review prior to initial operation of the new or modified facility or system.

History: Amended effective December 1, 1982; July 1, 1988.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03, 61-28.1-04

33-17-01-18. Operation and maintenance. Public water systems shall be supervised by competent personnel and modified, operated, and maintained in accordance with guidelines that may be developed or amended by the department. Certified operators are required for all water systems serving five hundred or more users under North Dakota Century Code chapter 23-26. Beginning July 1, 1994, North Dakota Century Code chapter 23-26 required certified operators for all public

water systems except those that serve other than year-round residents and meet all of the following conditions:

1. The water supply is obtained solely from ground water sources that the department has determined are not under the direct influence of surface water.
2. Treatment, if provided, consists strictly of disinfection, fluoridation, sequestration, corrosion control, or other processes that involve simple chemical addition and minor operational control.
3. The water supply system is not required by the federal Safe Drinking Water Act or its implementing regulations to be operated by qualified personnel.

History: Amended effective July 1, 1988; February 1, 1993.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-19. Protection of public water systems.

1. Cross-connection control.

- a. Cross connections are prohibited except when and where, as approved by the authority having jurisdiction, suitable protective devices are installed, tested, and maintained to ensure proper operation on a continuing basis.
- b. A system shall be designed, installed, and maintained in such a manner as to prevent nonpotable liquids, solids, or gases from being introduced into the water through cross connections or any other piping connections to the system.

2. Interconnections.

- a. Interconnection between two or more systems shall be permitted only with the written approval of the department.
- b. Interconnection between a nonpublic and public water system shall not be permitted unless specifically approved in writing by the department.

3. Return of used water prohibited. Water used for cooling, heating, or other purposes shall not be returned to the system. Such water may be discharged into an approved drainage system through an airgap or may be used for nonpotable purposes.

4. Products in contact with water. All products that may come into contact with water intended for use in a public water system must meet

American national standards institute/national sanitation foundation international standards 60-1988 and 61-1991. Suppliers of water for public water systems may not willfully introduce or permit the introduction of a product into the public water system which has not first been determined to meet these standards. At the discretion of the department, suppliers of water for public water systems shall compile and maintain on file for inspection by the department a list of all products used by the system. Prior to using a product not on the list, suppliers of water for public water systems shall either determine that the product meets appropriate American national standards institute/national sanitation foundation international standards or notify the department of the type, name, and manufacturer of the product. A product will be considered as meeting these standards if so certified by an organization accredited by the American national standards institute to test and certify such products.

5. **Used materials.** Containers, piping, or materials which have been used for any purpose other than conveying potable water shall not be used.
6. **Water storage structures.** Finished water storage structures shall have a watertight cover which excludes the entrance of birds, animals, insects, and excessive dust. Beginning February 16, 1999, public water systems shall not begin construction of uncovered finished water storage facilities.
7. **Turbidity control.** Subpart H systems that provide conventional filtration treatment or direct filtration shall develop individual filter profiles, perform individual filter self-assessments, and arrange for the completion of comprehensive performance evaluations as set forth under title 40, Code of Federal Regulations, subparts P and T. At the direction of the department, systems that are required to conduct a comprehensive performance evaluation shall arrange for the completion of a full composite correction program and implement followup recommendations that result from the composite correction program. Comprehensive performance evaluations and composite correction programs shall be conducted by a party other than the system which is approved by the department.

History: Effective December 1, 1982; amended effective July 1, 1988; August 1, 1994; August 1, 2000; April 1, 2005.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

33-17-01-20. Ground water system - Source requirements. In addition to the remaining provisions of this chapter, public water systems utilizing ground water sources shall comply with the monitoring and treatment technique requirements and undergo sanitary surveys as set forth under title 40, Code of Federal Regulations, part 141, subpart S. This applies to public water systems that

are consecutive users but not to subpart H systems and systems that combine all of their ground water with surface water prior to treatment.

History: Effective January 1, 2010.

General Authority: NDCC 61-28.1-03

Law Implemented: NDCC 61-28.1-03

2013 NATIONAL CAPACITY DEVELOPMENT AND OPERATOR CERTIFICATION WORKSHOP

**GETTING THE JOB DONE: INTEGRATING SUSTAINABILITY INTO
PROGRAM MANAGEMENT**

**November 19 – 21, 2013
Atlanta, Georgia**

WORKSHOP SUMMARY

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COMMONLY USED ACRONYMS

ASDWA	ASSOCIATION OF STATE DRINKING WATER ADMINISTRATORS
AWOP	AREA-WIDE OPTIMIZATION PROGRAM
CEU	CONTINUING EDUCATION UNIT
CWS	COMMUNITY WATER SYSTEM
DWSRF	DRINKING WATER STATE REVOLVING FUND
EPA	ENVIRONMENTAL PROTECTION AGENCY
ERG	EXPENSE REIMBURSEMENT GRANT
ETT	ENFORCEMENT TARGETING TOOL
NCWS	NON-COMMUNITY WATER SYSTEM
NTNCWS	NON-TRANSIENT NON-COMMUNITY WATER SYSTEM
OGWDW	OFFICE OF GROUND WATER AND DRINKING WATER (EPA)
PWS	PUBLIC WATER SYSTEM
PWSID	PUBLIC WATER SYSTEM IDENTIFICATION
RTCR	REVISED TOTAL COLIFORM RULE
SDWA	SAFE DRINKING WATER ACT
SDWIS	SAFE DRINKING WATER INFORMATION SYSTEM
TA	TECHNICAL ASSISTANCE
TMF	TECHNICAL, MANAGERIAL AND FINANCIAL
TNCWS	TRANSIENT NON-COMMUNITY WATER SYSTEM
USDA	UNITED STATES DEPARTMENT OF AGRICULTURE

EXECUTIVE SUMMARY

The 2013 National Capacity Development and Operator Certification Workshop was held from November 19-21 in Atlanta, Georgia. The theme “Integrating Sustainability into Program Management,” focused on how the programs can collaborate in enhancing the capacity and resiliency of public water systems (PWSs) to provide safe drinking water. Several sessions focused on the “basics” of program implementation, re-enforcing the duties and responsibilities of states and the EPA. Other sessions explored the “hot issues” facing state programs today, and generated ideas about how EPA and states can collaborate on overcoming challenges together.

The workshop included 8 joint sessions and 5 tracked sessions. Joint sessions focused on the importance of collaboration to achieve program goals and PWS sustainability, especially needed in a time of financial constraints and budget uncertainty. Communication is necessary for collaboration and three joint sessions addressed the importance of effective communication. [Session 8](#) highlighted communication techniques for operators and decision-makers and examples of communication between state programs were showcased in [Session 2](#) and through a Table Top Exercise in [Session 3](#). Other joint sessions addressed: recent tools and resources developed through state-EPA workgroups over the last three years ([Session 1](#)); how the Revised Total Coliform Rule (RTCR) will affect the Capacity Development and Operator Certification programs ([Session 5](#)); how to reach and effectively assist Non-Community Water Systems ([Session 7](#)); and the sustainability efforts of EPA’s federal partners, USDA Rural Development and Department of Veterans Affairs ([Session 10](#)).

The Capacity Development sessions featured program specific topics including the Triennial Capacity Development Governor’s Reports ([Session 6A](#)), and implementing and revising Capacity Development Strategies ([Session 4A](#)). Playing into one of the recurring themes of the workshop, one session focused on the different approaches to communication that can help systems enhance their managerial and financial capacity ([Session 9A](#)). Examples of how states are funding small system resiliency efforts and how one state uses financial action plans to improve small system sustainability were presented ([Session 11A](#)). Finally, EPA and state representatives in the Capacity Development brainstormed together on projects to facilitate over the next 2-3 years ([Session 12A](#)).

The Operator Certification sessions covered a variety of Operator Certification-specific issues, including the importance of validating operator exams ([Session 11B](#)) and how states can conduct external program reviews ([Session 6B](#)). One session explored innovative approaches and techniques for operator training ([Session 9B](#)). Another session featured a line-up of speakers addressing the “hot topics” within the Operator Certification program ([Session 4B](#)). At the end of the workshop, EPA and state representatives brainstormed priorities to address over the next 2-3 years ([Session 12B](#)).

The workshop concluded with report-outs from the Capacity Development and Operator Certification brainstorming sessions, with a commitment from EPA Headquarters and ASDWA to develop a series of next steps and reach out to states and technical assistance providers on new activities to support the programs.

JOINT SESSIONS

WELCOME AND INTRODUCTION TO THE WORKSHOP

State and EPA representatives were welcomed to the 2013 National Capacity Development and Operator Certification Workshop, co-hosted by the U.S. EPA and ASDWA.

Theme: Integrating sustainability into program management and promoting collaboration.

Presenter: Jim Taft (ASDWA)

The workshop is an important opportunity to talk about small public water system challenges and enhance the capacity and understanding of the individuals involved with these systems. Representatives from both the Operator Certification and Capacity Development programs have the opportunity to find common challenges and opportunities to work together. At the end of the workshop, participants will have an opportunity to brainstorm where the programs need to go over the next 2-3 years.

Presenter: Ted Jackson (Georgia Environmental Protection Division)

Capacity is not only the nuts and bolts (i.e., infrastructure needed to ensure capacity), but involves people working together to ensure customers have safe drinking water. It's vital to develop well-trained operators to ensure PWSs are adequately maintained and develop well-trained Operator Certification Program staff to better provide oversight to these individuals. Finally, sustainability means "to hold up from underneath." It is important for programs to collaborate to sustain PWSs using the available financial resources.

Presenter: Eric Bissonette (U.S. EPA OGWDW)

Approximately 95 percent of the national inventory consists of small public drinking water systems (PWSs), serving fewer than 3,300 people. These PWSs face challenges including: aging infrastructure concerns; workforce shortfalls; high turn-over rates; increasing costs; declining rate bases; and political turmoil. Strengthening the technical, managerial and financial capacity of small PWSs is one of five Agency Priority Goals. To help meet this goal, workgroups were held on a variety of topics including: workforce development; asset management; managerial capacity; water system partnerships; and drinking water program collaboration. These workgroups represented a broad-range of individuals, and resulted in effective products to help to further the efforts of both programs. During the workshop, we will discuss issues that face PWSs, including resiliency and preparedness, ensuring water systems are prepared for impacts that may come from a changing climate and program collaboration to manage state drinking water programs.

Presenter: Jim Giattina (U.S. EPA Region 4)

Capacity Development and Operator Certification programs must collaborate with each other and other state and federal programs to ensure PWSs have a sustainable footing. Activities to help to ensure sustainability include: compliance assistance; rate studies; workforce development; and asset management. Region 4 has quite a few exciting efforts underway that demonstrate the effectiveness of collaboration, including comprehensive water management planning in Georgia, a new energy management initiative for water and wastewater utilities in Tennessee, and area-wide optimization efforts in several states in the Region. Budget continues to be a subject of concern. The Drinking Water Infrastructure Needs Survey and Assessment (DWINSA) highlighted that approximately \$384 billion is

needed to invest in rehabilitation and replacement of aging infrastructure. There are many funding uncertainties in the future. An additional challenge is the upcoming rollout of the Revised Total Coliform Rule (RTCR), which applies to all PWSs. The Capacity Development and Operator Certification Programs will impact the effectiveness of the rule.

SESSION 1: PAVING THE PATH TOWARD SUSTAINABILITY

The session provided an overview of the activities since the 2010 workshop. Since 2010, EPA and states launched several initiatives aimed at re-energizing the programs through sharing experiences, developing new tools and resources and conducting trainings designed to support the needs and priorities identified by workshop participants.

Theme: Past, current and future approaches to ensuring PWS sustainability.

Presenter: Mindy Eisenberg (U.S. EPA OGWDW)

Presentation: Paving the Path toward Sustainability

Since the 2010 workshop, EPA has supported efforts to ensure the sustainability of small PWSs and enhance their TMF capacity. To successfully ensure sustainability, it is important to have a sustainable community. A sustainable community requires a sustainable water sector, which requires sustainable water infrastructure. All of these pieces fit together to ensure safe drinking water and promote public health.

Of the 156,000 PWSs that EPA tracks, most are small PWSs. Many of these PWSs have aging infrastructure and a workforce near retirement, along with other challenges. Our work is driven by the goal of having sustainable PWSs with a knowledgeable workforce, short- and long-term financial resources, regulatory compliance, effective management practices and proactive outreach and communication. Each PWS has unique challenges and we have to use a variety of approaches to help them achieve sustainability.

Together, states and EPA have made several exciting accomplishments:

- Several workgroups on: program collaboration; managerial capacity; and workforce development.
- ASDWA's CapCert Community provides the opportunity for communication across programs to share examples and materials as well as ask questions.
- Federal Partnerships, including: EPA-USDA's Memorandum of Agreement (MOA) to ensure the sustainability of small and rural water and wastewater systems; and EPA-Veterans Affairs' MOU to raise awareness of water sector careers and to provide resources to help train potential operators.
- Sustainability tools and resources, including: Check Up Program for Small Systems (CUPSS) Community Calls; factsheets to highlight water efficiency practices for PWSs; and an Energy Use Assessment spreadsheet tool to determine PWS energy usage and ways to reduce costs.
- A number of upcoming resources resulting from workgroup efforts include: Small PWS Resource Guide to Support Hiring and Contracting a Licensed/Certified Operator; Reference Guide for Asset Management Tools; and Non-community Water System document continuing the re-energizing Capacity Development effort.

- Overall, EPA exceeded the Small System Priority Goal outlined in the FY12 President’s budget, in part due to successful state participation. The quarterly reports highlight accomplishments towards these goals and are posted on www.performance.gov.

During the workshop, EPA, states and TA providers will share experiences and foster collaboration and coordination, as well as chart the direction for next 2 to 3 years. Our path forward will include continuing to build strong Capacity Development and Operator Certification programs. We will continue to promote sustainable practices, including resiliency (water availability/water quality), infrastructure renewal and replacement, and strong communication skills (developing relationship with the community). We will work together to ensure a certified and trained workforce. We will continue to promote water system partnerships, including consolidation, operator sharing, regionalization and other forms of managerial partnerships. State-EPA partnerships will be central to ensuring the success both programs.

Questions/Comments

- Is EPA’s report about the President’s priority goals posted on the Web?
 - EPA’s quarterly reports are located at www.performance.gov. EPA hopes to conduct a webinar in the future to share reported activities.
 - It is important for states to highlight priority goals met and report these successes back to their management.
 - Each quarter EPA wrote progress reports that contained anecdotal information from states, which are located on www.performance.gov. These reports do not contain everything reported by states to EPA, but summarize this information.
- Are other performance partnership grant (PPG) states experiencing re-routed resources?
 - ASDWA is releasing a report on state resource needs. During the development of this report, ASDWA found an increase in set-aside use to supplement core programs. As PWSS grant funds go to other programs, set-asides appear to be filling the gap. Based on ASDWA’s survey, six PPG states are not getting the full amount of the funds, and a few of these states are giving funds to source water protection. Overall, the survey indicated that this was not a significant issue.
- Provide more information on private/public partnerships. In Kentucky, small PWSs have begun to partner with larger PWSs.
 - EPA will flag this issue and consider it for possible work in the future.
- Provide tools and best practices on what states are doing to help PWSs achieve capacity.
- Many states are using set-asides to fund core programs, including core capacities at very small PWSs. What will be the impact if DWSRF funds were to go away?
 - EPA recognizes the potential impact if DWSRF were to go away.
 - ASDWA is concerned about disappearing DWSRF funds and developed a letter expressing their concerns in relation to the WIFIA legislation.
- Many states have worked through the TA and training grant process and have found it difficult to coordinate.
 - EPA will be holding a webinar once the FY13 grants have been awarded. If states have specific problems, they can talk to Steve Hogye (U.S. EPA OGWDW), who is leading the grant effort.

SESSION 2: BUILDING THE BRIDGE BETWEEN CAPACITY DEVELOPMENT AND OPERATOR CERTIFICATION PROGRAMS

Moderator: Sonia Brubaker (U.S. EPA OGWDW)

This session presented some examples of coordination between the Capacity Development and Operator Certifications programs that are able to leverage authority, knowledge and/or funding to assist in prioritizing PWSs for assistance and improve public health protection.

Theme: Program collaboration/coordination to maximize available resources.

Presenter: Steven Boudreau (Rhode Island Department of Health)

Presentation: Enhancing Public Health Protection through Program Collaboration

Rhode Island has one staff member to manage both the Capacity Development and Operator Certification programs. Collaboration with other drinking water staff is important in order to manage workload and meet goals. The Rhode Island Capacity Development Program prioritizes PWSs for state assistance by ranking them on a scale of 1 to 4 (with 1 being no assistance needed and 4 being enforcement required). Factors considered in the ranking include compliance, condition, impact of future regulations and system capacity.

The Rhode Island Operator Certification Program tracks PWS violations in relation to the designated operator in charge, and looks specifically at PWSs with four or more violations in the previous 12 months. A report is developed and reviewed by the State Board to determine if operator negligence is the cause of the compliance issue and to find solutions to address the compliance issue.

Rhode Island developed a Fast-Track-to-Compliance Program, which is a collaborative effort among the Capacity Development, Operator Certification, DWSRF and Compliance programs. The Program is intended to expedite the process of assisting PWSs, although it is fairly time-intensive for the state. To date, the Program has been used for three PWSs with a Capacity Development ranking of 4. The Program's four steps include:

1. Analyze and Engage – Determine what assistance is needed based on the PWS' existing and needed capacity.
2. Assess – Develop an improvement plan based on the Effective Utility Management (EUM) attributes.
3. Respond – Establish a corrective action plan with both short-term and long-term measures. The plan may include actions for a variety of individuals, such as staff from the PWS, the municipality or various state departments. Rhode Island treats the plan as a living document that is subject to change.
4. Implement – Carry out the plan with guidance from the Capacity Development staff.

Presenter: Armando Herald (Colorado Department of Public Health and the Environment)

Presentation: Improving Safe Drinking Water through Partnerships: The Value of a Dedicated Operator Certification Liaison

Colorado's Capacity Development Program is now called the Local Assistance Program. The Program provides training, coaching and other assistance to PWSs.

Colorado's 2015 Training Strategy, finalized in 2010, established a goal of having high-quality, relevant and well-coordinated training that is focused on the identified needs of PWSs. A Training Framework Task Force was established to meet this goal, which was comprised of numerous public and private partners.

The Local Assistance Program struggled with the high volume of PWS operators in need of state assistance. As a result, Colorado established a dedicated Operator Certification Liaison to perform outreach to PWSs and serve as a connection between the Local Assistance Program and the Operator Certification Program. This position improved alignment of both program's activities intended to address operators' challenges.

Questions/Comments

- How did PWSs react to Rhode Island's Fast-Track-to-Compliance Program?
 - The Program's first three PWSs initially reacted poorly, but two are now on the path to compliance and one is using a Community Development Block Grant to install new wells for homeowners.
- For Rhode Island's Capacity Development Program state assistance ranking, did the state use the ETT to help determine the ranking?
 - The State Board does not look at the ETT, but the Capacity Development Program does consider ETT scores when prioritizing PWSs in need of state assistance.
- Does Rhode Island use receiverships for PWSs when needed?
 - Rhode Island does not take receivership of PWSs but will use the threat of condemning homes when necessary.
- Are there other states in which one person is both the Capacity Development Representative and the Operator Certification Representative?
 - Of the staff present for the session: Wisconsin (with assistance from one other staff member); New York (with assistance from one other staff member); Idaho (no other staff); and Ohio (with assistance from several other staff).
- How was Colorado able to get so many partners to participate in the Training Framework Task Force?
 - DWSRF set-asides are often used to support training; therefore, funding was a significant factor. Additionally, participants recognized that a coordinated effort was much more effective and allowed all trainers to achieve their goals.

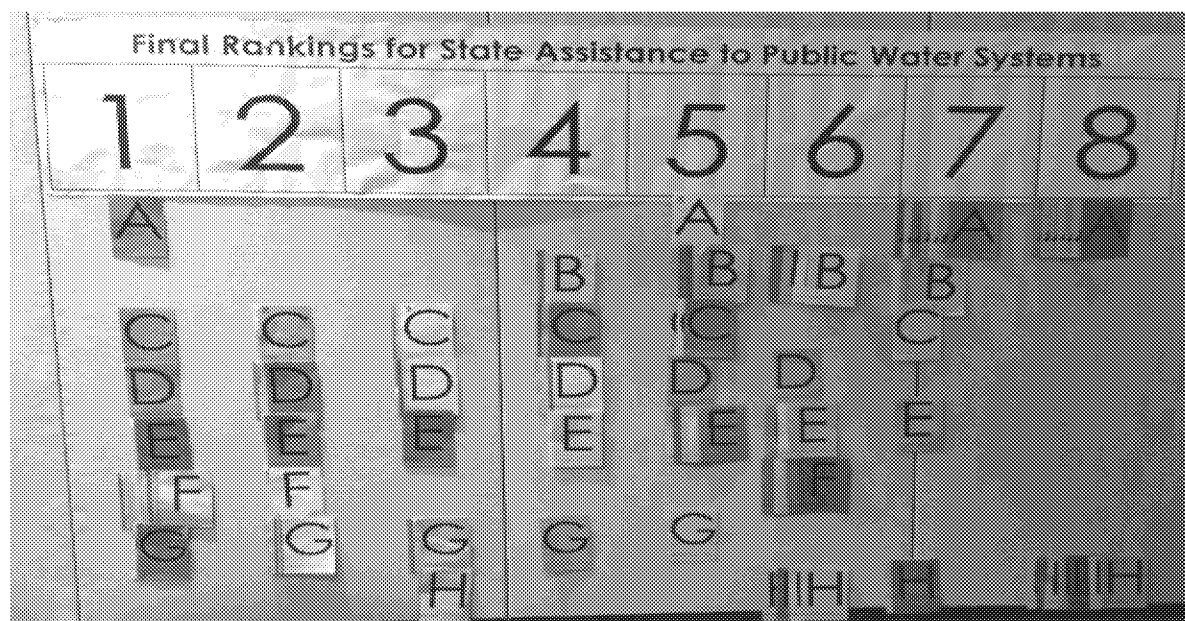
SESSION 3: COLLABORATING ACROSS STATE DRINKING WATER PROGRAMS TO SUPPORT SUSTAINABLE SYSTEMS: TABLE TOP EXERCISE

Moderator: Rudd Coffey (The Cadmus Group, Inc.)

This session was an interactive table top exercise that emphasized collaboration across drinking water programs. Teams were formed with participants assigned the role of either a State Capacity Development Representative, State Operator Certification Representative, State Enforcement Representative, State DWSRF Representative or State Drinking Water Administrator. Each team worked together to prioritize PWSs for technical and financial assistance, and then reported results to the group.

Theme: Program collaboration/coordination to prioritize PWSs needing assistance.

Table Top Exercise Results: Final Rankings for State Assistance to Public Water Systems



SESSION 5: GETTING READY FOR THE REVISED TOTAL COLIFORM RULE

Moderator: Dale Froneberger (U.S. EPA Region 4)

This session covered how the Revised Total Coliform Rule (RTCR) will affect the Capacity Development and Operator Certification Programs. Nancy Ho provided a general overview of the rule to provide participants with a general understanding of the rule requirements to enable them to begin to get organized and creative about implementing the requirements in their own state. Speakers discussed how states are modifying their activities in preparation for RTCR compliance.

Themes: RTCR compliance requirements, state preparation for Level 1 and 2 Assessments and seasonal system requirements.

Presenter: Nancy Ho (U.S. EPA OGWDW)

Presentation: Revised Total Coliform Rule

Major components of the RTCR:

- Routine and repeat monitoring must be conducted by all PWSs after a total coliform-positive (TC+) or E. coli-positive (EC+) sample. An E. coli violation is based on a combination of positive routine and repeat sample results.
- PWSs may trigger Level 1 and Level 2 Assessments under the rule. Assessments are required to identify the cause of a sanitary defect. Following the assessment, PWSs must take corrective action for any sanitary defects identified. Level 1 Assessments are conducted by the PWS, and Level 2 Assessments are conducted by a state-approved party.

RTCR defines seasonal water systems and their specific requirements.

- Seasonal systems are defined in the RTCR as a Non-Community Water System (NCWS) that is not operated as a PWS on a year-round basis and starts up and shuts down at the beginning and end of each operating season.
- Seasonal PWSs must have a state-approved start-up procedure prior to serving water to the public. These PWSs may be exempt from these procedures if they pressurize the system year-round.
- Seasonal PWSs must sample during vulnerable periods. States should provide TA to help states determine vulnerable PWSs.

Reduced monitoring is only allowable for ground water PWSs and there are strict criteria to be able to reduce monitoring, including but not limited to: a clean compliance history; certified operator requirements; and no sanitary defects.

During a state's RTCR regulation development, they may want to consider:

- Increased certification level required to perform a Level 1 Assessment.
- What parties are allowed to perform a Level 2 Assessment.
- State criteria for reduced monitoring, including what requirements and exemptions will be allowed.

When implementing the RTCR, states will have to determine for a Level 1 Assessment:

- How to educate PWSs when a Level 1 assessment is required.
- Best method of communication between labs, PWSs and the state.
- How to handle the short timeframe required for this assessment.

When implementing the RTCR, states will have to determine for a Level 2 Assessment:

- Approved parties to perform the assessment.

States may consider providing additional training to PWSs, including training on: clean compliance history; required criteria for reduced monitoring; and how to conduct sampling for dual sample sets for the GWR and RTCR (e.g., filling-out sample forms). PWSs should learn to identify and correct sanitary deficiencies as soon as possible. In some cases, states will have to decide between requiring repeat monitoring versus assessments (an assessment takes more work but may better correct significant deficiencies).

It is important that states ensure PWSs collect all routine and repeat samples, which will help reduce the assessments needed and reduce the overall workload of PWSs and states.

Set-asides funds are able to support RTCR activities, including: special monitoring evaluations; wellhead/source water protection; approval of design criteria; Level 1 and Level 2 Assessments; and direct technical assistance.

Potential DWSRF projects may include: projects related to E. coli MCL violations; correction of sanitary defects; and disinfection, which may be required by seasonal systems prior to serving water to the public.

Presenter: Mike Wentink (Nebraska Department of Health and Human Services)

Presentation: RTCR – Impacts?

Nebraska has developed a checklist approach for conducting Level 1 and Level 2 Assessments for the RTCR. Nebraska has a significant number of small PWSs. Of the 1,300 PWSs they oversee, only 29 serve greater than 5,000 people. Many of these PWSs have only one or two operators, who may also have other jobs. These PWSs typically do not have a staff person with a designated role for regulatory compliance; therefore RTCR education can be difficult. RTCR has a modified philosophy (find and fix approach) and modified mechanics (MCL and assessments), which is different from the Total Coliform Rule (TCR). Nebraska must educate operators on the new MCL requirement.

Nebraska currently uses a checklist to conduct assessments in the state. This process, conducted by operators, has helped to educate the operators on the functioning of their PWS. The checklists include:

- Limited checklist: Required following 2 TCR violations over last 12 months. The operator fills out a checklist within 30 days and corrective action is required.
- Extended checklist: Required following 3 TCR violations over last 12 months. The operator fills out a more extensive checklist within 30 days and corrective action is required.

Nebraska's field representatives process the checklists. They provide a good educational tool for operators to effectively identify causes of total coliform problems, thus improving compliance. Nebraska will need to change their process based on RTCR requirements. Overall, the assessment process itself should not be a big issue in the state, as many operators are very familiar with the process.

Presenter: Jerry Smith (Minnesota Department of Health)

Presentation: Preparing For the Revised Total Coliform Rule (RTCR): Details, Defects and Triggers – “Oh My”

Requirements are interwoven under the RTCR. Because the RTCR affects all systems, states must know their universe of PWSs. States must also prepare for enforcement activities under the RTCR. In Minnesota, the state will be doing all RTCR monitoring for all NCWSs. The state will be performing assessments for these PWSs. On average, state staff will be performing about 700 assessments. Minnesota does not plan to wait until repeat samples come back to perform an assessment. Instead, state staff will perform the assessment at the time a sample has been taken.

Minnesota's annual site visit is equivalent to a Level 2 Assessment. The state performs 6,000 site visits each year. Currently, the state is performing more informal annual site visits and is currently performing informal transactional documentation. The state will need to attribute more resources to this activity to formalize the process to meet RTCR requirements.

In Minnesota, some NCWSs do not have a certified operator. Running a business is the first and foremost priority for these PWSs. NCWS owners will need to be trained on how to complete a Level 1 Assessment under the RTCR. If both the state and PWS are conducting assessments, Minnesota may be performing more than one assessment per PWS over a 12-month period of time. NCWSs in Minnesota rely strongly on reduced monitoring. This monitoring schedule requires a lot of work to support. Minnesota will address all TC+ results at PWSs as acute. In addition, the state will work to ensure well and plumbing construction code compliance at these PWSs.

Seasonal system challenges include: start-up and shut-down procedures; data management (effective electronic processes); and training. Minnesota is communicating with resort associations and off-site NCWS management to prepare them for RTCR requirements. Minnesota will have dedicated seasonal system staff from April to June. Disinfection is strongly encouraged as part of a seasonal system plan.

Moving forward, Minnesota will need to think about how to address issues, such as new well construction and operator training, to prepare for the RTCR.

Questions/Comments

- Operator Certification staff may want to consider the impact of a Level 1 Assessment on a PWSs' integrity. Components of asset management are incorporated into Level 1 Assessments.
- Both Capacity Development and Operator Certification programs should consider primacy requirements, particularly as they pertain to implementing Level 1 and Level 2 Assessments.
- Capacity Development staff should consider the statute for economic development when assessing a PWS's TMF capacity in relation to the RTCR.
- If TA providers are used to conducting Level 2 Assessments, how would it work when they are siting sanitary defects, which is an enforcement issue? Typically, TA providers like to separate themselves from these issues.
 - Minnesota has not looked into using TA providers for Level 2 Assessments, as the state will be doing all Level 2 assessments for PWSs. The state does not want to have to get TA providers involved. Conducting these assessments should not be a heavy workload for the state, as the state will be providing a lot of monitoring support, and therefore hopes to avoid frequent need for Level 2 Assessments.
 - Nebraska also plans to perform Level 2 Assessments in-house to ensure uniformity and speed.
 - There are ways to use TA providers during the corrective action phase to help PWSs correct sanitary defects. This position may be a more natural fit for TA providers.
- Would EPA require states to perform a Level 2 Assessment in addition to a sanitary survey?
 - As long as the sanitary surveys meet timing requirements when a Level 2 Assessment is completed, you are allowed to use a sanitary survey to meet Level 2 Assessment requirements. The timeframe for a Level 2 Assessment is 30 days, which is tight.
 - Minnesota maintains list of sanitary defects for the TCR. If the state identifies a significant deficiency at the PWS, it would not be allowed reduced monitoring. The significant deficiency would need to be corrected, as they would during a Level 1 or 2 Assessment.
- An overall challenge is to identify and train owners and operators of small NCWSs. Are there types of support to help states in the process of reaching out to small PWSs? EPA wants to know what tools are useful for states and PWSs, particularly NCWSs. Tools/resources include:
 - EPA's RTCR Training Webinars.
 - RTCR Assessments and Corrective Actions Guidance Manual (Spring/Summer 2014).
 - Draft Small Systems Guidance (Systems ≤ 1,000) (Spring/Summer 2014).
 - RTCR State Implementation Guidance (Interim Draft version available in January 2014 for comment).
 - RTCR Quick Reference Guide (September 2013).
 - Various RTCR Factsheets (2014-2015).

SESSION 7: BUILDING THE CAPACITY OF NON-COMMUNITY WATER SYSTEMS

Moderator: Mindy Eisenberg (U.S. EPA OGWDW)

This session provided an overview of the issues facing NCWSs, as well as the findings of the EPA-State Non-Community Water Systems Workgroup. This session also included an open discussion on NCWS capacity and challenges.

Themes: Challenges and recommendations to assist NCWSs.

Presenter: Steve Hogue (U.S. EPA OGWDW)

Presentation: EPA-State Non-Community Water System Workgroup: Findings and Best Practices

From 2012-2013, EPA facilitated a state-EPA workgroup to look at the challenges in reaching out and providing assistance to non-community water systems. States and EPA recognized that NCWSs had not been previously addressed by the Re-energizing Workgroup, and have unique challenges that differ from CWSs. NCWSs have particular characteristics with respect to TMF capacity and often view the provision of water as ancillary to their main business. Furthermore, TNCWSs are generally not required to have a certified operator. Over two-thirds of all PWSs are NCWSs (104,020 systems), most of which are very small systems. NCWSs serve 19.2 million people, and most are TNCWSs (82 percent).

The NCWS Workgroup included representatives from eight states, ASDWA, five EPA Regions, EPA Headquarters and EPA's Office of Research and Development (ORD). The Workgroup was tasked with identifying specific challenges faced by NCWSs and states, sharing successful approaches, discussing resources and opportunities to assist NCWSs and informing implementation of the RTCR. The Workgroup discussed education/outreach, seasonal systems, the proposed RTCR, managerial and financial capacity, operators and operator certification, partnering with agencies to assist NCWSs and technical capacity issues.

The NCWS Workgroup developed a report of NCWS findings, best practices and challenges, including state examples. Recommendations included: 1) conduct outreach and education specific to the needs of NCWSs; 2) assist NCWSs with capacity challenges; and 3) implement practices that efficiently and effectively address the compliance needs of NCWSs.

- Theme 1: Conduct outreach and education specific to the needs of NCWSs. This recommendation addresses how to manage the large NCWS inventory or remote locations of NCWSs; how to make outreach and education relevant to NCWSs; high operator turnover and associated lack of knowledge transfer; and seasonal system shutdown/startup procedures.
- Theme 2: Assist NCWSs with capacity challenges. This recommendation addresses the difficulty in accessing funding sources to address compliance issues; unknown or unassessed TMF capacity; difficulty meeting requirements for contaminant removal, monitoring and/or reporting (e.g., total coliform); and not properly overseeing or effectively utilizing contract operators.
- Theme 3: Implement practices that efficiently and effectively address the needs of NCWSs. This recommendation addresses the challenges states may face associated with NCWS compliance issues and collaborative opportunities with other state agencies or TA providers.

Appendix B to the report includes an extensive matrix of tools, practices, publications and other resources, which EPA intends to periodically update.

The NCWS Workgroup's next steps include: finalizing and promoting the findings report (including a webinar in 2014); sharing the summary listing and description of state materials through ASDWA;

developing RTCR materials for NCWSs, and continuing the national dialog among the states and EPA to share successful approaches and address common issues.

Presenter: Jerry Smith (Minnesota Department of Health)

Presentation: Enhancing Communication between States and NCWSs – A Minnesota Perspective

Minnesota has a large inventory of PWSs, some are which are in very remote locations. Challenges NCWSs face include: drinking water is not part of NCWSs' main business; frequent staff changes; offsite management challenges (no direct responsibility); lack of knowledge of the SDWA; not understanding that their business qualifies as a PWS (public health concern); and not performing financial planning. Most PWS owners want to provide safe water to their customers, particularly those in the hospitality industry.

NCWSs require a significant amount of state attention and "hand-holding". Any communication to NCWSs needs to be concise and direct. Measures Minnesota has implemented to assist NCWSs include:

- Developing a guidance manual for operators of very small systems and TNCWSs.
- Performing annual site visits, which allow for one-on-one contact and discussion with NCWSs.
- Contracting the Minnesota Rural Water Association to conduct training for NCWSs at their annual conference, as well as satellite locations (no more than 2 hours distance).
- Calling to remind NCWSs serving more than 1,000 customers or using surface water that samples must be taken.

EPA Region 5 initiated a Collaboration Approach for NCWSs through which NCWS managers in Region 5 states meet annually to exchange ideas, tools and information. The team now also holds a conference call each month.

Minnesota participated in the NCWS Workgroup and sees the findings report as an extension of the Region 5 Collaboration Approach. As a result of Workgroup, Minnesota is pursuing some of the recommendations presented in the report.

Two important takeaways: 1) resources are limited, so do not "reinvent the wheel" and instead adapt existing materials as needed; and 2) share ideas within and between states.

Questions/Comments

- How many states are able to provide DWSRF funding to NCWSs? How many states are limited to providing this DWSRF funding to non-profit NCWSs? How many states are able to fund for-profit NCWSs?
 - Some states are able to provide DWSRF funding to NCWSs. Of these states, most are limited to providing this DWSRF funding to non-profit NCWSs, and very few states are able to fund for-profit NCWSs.
 - One state noted the need to ensure that NCWS owners/operators are well-informed about the treatment they select (and its associated short-term and long-term costs).
- During the Annual Small Systems Technical Drinking Water Workshop in September, some effective and efficient approaches to improving compliance of NCWSs were identified, including:
 - Adding a NCWS community on ASDWA's webpage.
 - Holding a national webinar to discuss NCWS issues.
 - Developing a SDWA compliance smartphone application for NCWS owners/operators.
 - Utilizing free resources from www.smallwatersupply.org (private well owner class).

- Most Region 5 states have local health departments. Local health departments play an important role, including operator certification and follow-up, though this is only a small part of their jobs. Local health departments may not be knowledgeable about drinking water regulations (e.g., lead and copper). Meetings with local health department staff are useful. Additionally, local health departments need materials that are short, direct and concise to avoid NCWSs receiving conflicting or incorrect information. States and EPA need to think about how to involve local health departments in assisting NCWSs.
- New Jersey has had some issues with operator certification for TNCWSs that have 4-log treatment. Does EPA have any additional guidance on this topic?
 - No, and EPA does not currently have any plans to update the guidance.
- Nebraska requires all PWSs to have an operator. The state finds that operator certification provides a useful link to TNCWSs, which often have the most issues. How many other states require TNCWSs to have a certified operator?
 - Approximately a dozen states require certification of TNCWS operators. California only requires certification if the TNCWS has treatment.

Facilitator: Mindy Eisenberg (U.S. EPA OGWDW)

Open Discussion on NCWSs

- What challenges are states facing with respect to NCWSs?
 - Source water protection and water quality are challenges because ground water wells are adjacent to septic systems. The state needs to break down barriers so that NCWSs can effectively work with public service agencies.
 - New York's state drinking water regulations are very long but are provided to NCWSs so that they know the law. The state has considered giving NCWSs a simplified and succinct set of regulations that are specific to NCWSs.
 - Nebraska developed an abridged version of their regulations specific to TNCWSs.
 - California struggled to receive consistent NCWS data from all counties. As a result, the state funded a project to make the data consistent and importable into SDWIS.
- What activities have states undertaken that have been successful in helping NCWSs?
 - Connecticut developed a screening process that local entities (e.g., zoning authorities, health departments) can use to determine if a new water system is a PWS. This has helped the state with NCWS inventory control.
- Do states have relationships with other state agencies (e.g., food or liquor licensing) that they can use to leverage authority and address NCWSs? Is this relationship solidified under a Memorandum of Understanding (MOU)?
 - A handful of states have developed these relationships.
 - New York has an MOU with the Agriculture and Markets Agency. Additionally, the team that assists NCWSs is contained within the same agency as the food service department.
- A theme that has emerged is the importance of using existing resources and adapting them as needed. What else can be done to help facilitate solutions to helping NCWSs?
 - Having samples collected by a TA provider or other partner can free up state staff to assist NCWSs.
- Would states be interested in having a NCWS bulletin board on ASDWA's website?
 - Most states indicated that they would be interested in this.

- Have there been any attempts to work from the top-down (e.g., national restaurant chains) in order to trickle down to local franchises?
 - The NCWS Workgroup discussed reaching out to parent companies and the U.S. Forest Service.
 - Minnesota has an exhibitors table to connect with hospitality groups (e.g., resort owner's association).
 - Nebraska collaborates with the Nebraska Department of Education to distribute information to rural schools.
 - Rhode Island has developed an informal relationship with a large convenience-store chain. Additionally, the Department of Health partners with the Department of Business Regulation to ensure that businesses (e.g., mobile home parks) have a letter of good standing before receiving a permit to operate.

SESSION 8: BUILDING THE PARTNERSHIP BETWEEN OPERATORS AND DECISION-MAKERS

Moderators: Sonia Brubaker and Matt Reed (U.S. EPA OGWDW)

This session focused on the role of communication for well-run PWSs. Presenters discussed the importance of communication at all levels in the organization and provided effective methods for communication. The session included a group exercise to put the communication skills learned to practice.

Theme: Effective methods of communication to ensure well-run PWSs.

Presenter: Heather Himmelberger (Southwestern Environmental Finance Center)

Presentation: Communication with a Purpose

Communication to the community is challenging for PWSs, as community members do not understand the value of water. It is important to tell a story and sell it. Communication is important at several different "levels" of a water system:

- Communication between an operator and decision-maker (e.g., owner): PWS decision-makers often do not listen to their operators. To ensure effective communication both parties may need to change how they communicate with each other. It is important that both sides have a chance to communicate, as both parties have unique and important information to bring to the table. Data-driven communication can be an effective approach to communicate with a decision-maker.
- Communication between a decision-maker and water board: Decision-makers may have more success communicating with the water board if they have a compelling and visual story to sell. For example, if trying to sell a rate increase, decision-makers may want to visually show the damage that could occur if PWS infrastructure is not replaced.
- Communication to the community: Communication must be specific. For example, explain what a rate increase would be used for. Communication should focus on the level of service, and what the service does, rather than the cost. For an example of this approach look to other service providers (e.g., cable and cell phone companies). The focus of these marketing campaigns is the product, not the cost.

Communication is the heart of collaboration. If states want to encourage systems to collaborate, they must begin to talk.

Presenter: Sarah Diefendorf (Dominican Environmental Finance Center)

Presentation: Communication with a Purpose

Story, message and image are important components of public communication. Frame the message by limiting the parameters of the story. Frame in the parameters of what you want to define. The story is not always complete. Use visuals and pictures; people conceptualize stories visually. Frame the story with pictures. Pictures elicit certain emotions. Simple pictures impart value (including fear-based values). Be consistent with the audience's values. Children elicit strong feelings; others include: energy; independence; strength; and freedom. Animals are an effective visual. Keep in mind that images mean different things to different people and connote different values.

Give ownership, allowing the audience to frame the message themselves. Impart the message of a shared challenge. An effective approach is to present a problem solution and reaction. Remember repetition: an audience needs to hear a message at least five times before it sinks in.

Group Exercise

The Challenge: How would a PWS communicate its needs to the board or to the public?

Groups came up with the following marketing ideas. A selection of groups provided the following responses:

Group 1.

- Greenville is turning brown.
- Invest in your future. Your village...your quality of life...all of this is impossible without water.
- Your system needs a physical.
- Cost of your water, compared to the cost if you do nothing.
- Visual comparative of the cost of goods and services.

Group 2.

- Visual: A picture of a group of children from community trying to play with water from the hose, but water just drips from the hose. Message: Is this enough for your children? Are you ready to play?

Group 3.

- Visual: A pitcher with no water pouring out.

Group 4.

- Level of services and what would happen if repairs are not done.
- Providing decision-makers with options.
- Communicate that a 30 percent rate increase will be incurred over the long-term.

Group 5.

- Visual: A child standing at the water fountain not able to get water. Message: What are we able to do when the well runs dry?
- Visual: Photo of section of pipe repeatedly replaced. Message: We all need less disruptions in our lives.

Group 6.

- No water = no sanitation.
- Loss of showers and toilet flushing really speaks to folks who say "I drink bottled water anyway...."

Group 7.

- Visual: Burning house with an empty fire hydrant.

Group 8.

- Frame problems and projects separately.
- Pay big later. Pay small now.

Group 9.

- For \$5 you can save Green Village Water.

Group 10.

- Rate per month per customer.
- Problem: Turning water on - no shower and no coffee. The fire department would not have water, which would incite fear in the community. Solution: Investment. Action: Be proactive and act now.
- New York State through a collaborative committee developed a brochure titled *The Value of Water*, which contains different messaging ideas that can help to communicate the value of water. The brochure was developed as a template, for any state to use. The brochure is interactive and available online. The committee is working on a companion brochure, aligned with the *Common Core: State Standards Initiative*, to assist teachers in teaching the topic in the classroom.

SESSION 10: PROMOTING SUSTAINABILITY WITH FEDERAL PARTNERS

Moderator: Mindy Eisenberg (U.S. EPA OGWDW)

This session addressed collaboration efforts between U.S. EPA and other federal partners to enhance the capacity and sustainability of small and rural PWSs and also confront operator/workforce challenges.

Themes: Collaboration between U.S. EPA and other federal partners, as well as collaboration between states and federal partners' local representatives.

Presenter: Jacki Ponti-Lazaruk (USDA Rural Development, Rural Utilities Service)

Presentation: Promoting Sustainability at Small and Rural Water Systems

Rural areas rely on USDA's Rural Development, Rural Utilities Service (RUS) to finance water and wastewater infrastructure improvements. The majority of RUS projects serve communities with a population of 10,000 or fewer people. Challenges facing rural areas include: aging infrastructure; increased costs to construct and operate PWSs; aging workforce; quality/quantity of water; and access to capital. To increase sustainability, it is necessary to build strong, rural communities.

USDA/EPA Rural Water and Wastewater System Sustainability Initiatives for fiscal year 2014 include:

- Focusing on high needs areas. Communities with a population of 2,500 or less and with less than 80 percent of median household income are eligible for a pre-planning grant.
- Using Preliminary Engineering Review (PER) template. The template is currently used in six states, and an electronic version is currently under development.
- Focusing on energy efficiency improvements and projects.
- Promoting the Workshop-in-a-Box, which includes a guide for the PWS and a guide for the trainer (described further by Jim Horne, see below).

To help promote sustainability at small and rural PWSs, states can: adopt and implement the new Preliminary Engineering Report (PER) template; partner with USDA on projects; conduct a rural sustainability workshop; leverage program tools to address enforcement issues; promote regular and ongoing board member training; ensure that all funded projects are built; facilitate communication and collaboration between rural PWSs, other utilities and community development partners; and talk to local students about careers in water.

Presenter: Jim Horne (U.S. EPA OWM)

Presentation: Sustainable Management of Rural and Small Systems

Two tools have been developed to help rural and small PWSs more effectively address challenges: the *Rural and Small Systems Guidebook to Sustainable Utility Management* and the *Workshop-in-a-Box*. These tools help PWSs to build and sustain TMF capacity; identify opportunities for water system partnerships; and promote the sustainability of rural and small communities.

The *Rural and Small Systems Guidebook to Sustainable Utility Management* takes PWSs through a self-assessment of their operations using ten key management areas. The assessment identifies strengths and areas for improvement to inform development of an action plan (and a simple improvement plan worksheet). PWSs rate their achievement in each of the management areas; rank the importance of each management area; and then plot results to identify critical areas for improvement. The Guidebook also includes an extensive resource guide, explains how to strategically use the tools and offers tips on how to follow-up on the action plan.

The Workshop-in-a-Box contains a series of materials and instructions to help both rural PWSs and trainers to market and conduct workshops on their own based on the Guidebook. The workshops can be conducted for a group of PWSs or an individual PWS. The materials, which were field tested by small and rural PWSs, are easy to use and are designed to help PWSs identify solutions based on community needs. EPA and USDA are hosting a train-the-trainer webinar to prepare groups to facilitate future workshops (scheduled for January 14, 2014). The webinar will be available after the meeting on ASDWA's CapCert Community.

To help promote sustainable management of small and rural PWSs, states can: become familiar with the Guidebook and the Workshop-in-a-Box; spread the word; build the Workshop into existing work plans with TA providers; and sponsor workshops and onsite assistance. If interested, states can contract the facilitator that USDA/EPA used to provide the train-the-trainer workshop.

Presenter: Angela Wilcher (Department of Veterans Affairs, National Employment Program)

Presentation: Veterans Affairs and EPA Efforts to Promote Water Sector Careers for Veterans

The Veterans Affairs Vocational Rehabilitation and Employment (VR&E) Program helps veterans return to the workforce and achieve independence in daily living. Veterans have a variety of innate qualities and abilities in the work they perform, including: an accelerated curve (transferrable skills and ability to learn quickly); leadership; teamwork (personal responsibility contributes to the team); and diversity and inclusion in action (experience in working alongside a diverse group).

On-the-Job Training (OJT) provides specific training for the veteran. PWSs pay an apprenticeship wage and VR&E pays the remaining wage. OJT often results in permanent full-time employment. Benefits to PWSs include: hiring qualified veterans at a training wage; VR&E purchases necessary tools, uniforms and other required supplies; VR&E provides support during the training and placement follow-up phases; and minimal paperwork.

The Special Employer Incentive is a 6-month program through which PWSs can hire a veteran to compensate for loss of production, additional supply or equipment or other costs. Benefits to the PWS include: PWS qualifies for reimbursement of up to 50 percent of the veteran's salary during the program; VR&E Representative assists with required paperwork; and the veteran is trained by PWSs' standards.

PWSs can find veterans through www.vetsuccess.gov, which is a comprehensive employment resource for all veterans and employers.

Questions/Comments

- One state receives many requests for materials to be translated into Spanish. Is EPA/USDA considering translating the Guidebook and Workshop-in-a-Box into Spanish?
 - Currently, the self-assessment worksheet is being translated into Spanish. Future consideration will be taken for translating the other materials.
- What is USDA's approach for rural communities with declining populations?
 - USDA wants to assist PWSs that are continuing to serve communities. If the proper infrastructure is in place, the municipality may be able to attract more residents. USDA is still concerned about the public health of remaining communities. However, USDA can only fund building out for reasonable growth.
 - Decentralized approaches may work in communities with declining populations that still need to provide safe water. EPA has information on this topic. Alternatively, these PWSs may want to consider entering into a water system partnership.
 - It is important to identify what jobs are available in rural areas and what training/certification is needed. Approximately 60 percent of veterans return to rural areas after their service.
- Florida has had a 100 percent exam pass rate for veterans the first time they take the operator certification exam.
- The GI Bill will pay up to \$2,000 for veterans to take training, exams, etc.

CAPACITY DEVELOPMENT SESSIONS

SESSION 4A: REVISING AND IMPLEMENTING CAPACITY DEVELOPMENT STRATEGIES

Moderator: Amy Camacho (U.S. EPA Region 6)

This session presented how states show progress through implementation and revisions to their Capacity Development Strategy.

Themes: Measuring and improving PWS capacity and drinking water program collaboration.

Presenter: Cathy Tucker-Vogel (Kansas Department of Health and Environment)

Presentation: Utilizing Web-Based TFM Assessments

The Kansas Capacity Development Program surveys each PWS in the state every 3 years. The survey data are used for many purposes, including the Annual Governor's Report and DWSRF evaluations. The previous paper survey was labor intensive, expensive and increased the potential for inconsistent and incomplete data. Kansas developed, with the assistance of Global Environmental Consulting, a Web-based survey tool called the Public Water Supply System Data Collector. The Web survey allows for real-time data, targeted surveys (e.g., by PWS size or location) and topic-specific surveys (e.g., water rates, emergency planning). The survey is accessible to state staff and registered users.

Presenter: Amy McLeod (Mississippi State Department of Health)

Presentation: Using Sanitary Surveys to Assess System Capacity

Mississippi visits each PWS in the state (approximately 1,160 systems) annually and conducts a formal sanitary survey every 3 years. Mississippi uses a Capacity Assessment Form to evaluate PWSs' capacity during site visits. Separate forms are used for CWSs (evaluated for TMF capacity), NTNCWSs (evaluated for technical and managerial capacity only) and private PWSs (evaluated for TMF capacity).

The assessments are scored on a scale of 0.0 to 5.0. Because the majority of Mississippi's PWSs use ground water, the assessment includes technical questions about Ground Water Rule (GWR) significant deficiencies. Low scoring PWSs are referred for assistance. Free TA services are available from the Mississippi Rural Water Association, Community Resource Group and the Mississippi State University Extension Service.

Mississippi holds an annual meeting of its Advisory Committee to review its Capacity Assessment Forms and determine if revisions are warranted.

Data from 2009-2013 show that there have been improvements in managerial and financial capacity (e.g., operators treating PWSs like businesses), but technical capacity has remained relatively unchanged.

Presenters: Jennifer Bunton (Iowa Department of Natural Resources) and Dale Froneberger (U.S. EPA Region 4)

Presentation: Building Capacity through Area-Wide Optimization Programs (AWOPs)

There are currently four regional AWOPs in the United States—in EPA Regions 3, 4, 6 and 10. The core of the AWOP is the network of participants (e.g., states, EPA, contractors, ASDWA), which gather for regional and national AWOP meetings.

AWOP's primary goal is to help systems provide safe water. Initially, AWOP was geared towards surface water PWSs (with a goal of reducing filter effluent turbidity to 0.10 Nephelometric Turbidity Units or less). However, AWOP is adaptable to all PWSs, including ground water PWSs.

AWOP can be incorporated into Capacity Development strategies through the prioritization of PWSs for assistance and measurement of progress. AWOP can enhance system capacity by: improving finished water quality; getting the most out of existing infrastructure by reducing unnecessary capital outlays; and promoting water conservation (and reducing associated energy/treatment costs).

Iowa adapted the AWOP model (status, targeted performance improvements and maintenance) to prioritize PWSs using TMF factors, including: gauging improvements in system capacity over time; prioritizing TA efforts; and focusing training to address the most frequent TMF deficiencies.

Setting optimization goals gives PWSs a target (e.g., turbidity goals for surface water PWSs and chlorine residual goals for ground water PWSs/distribution systems). In general, it is difficult to find an optimized PWS that does not have capacity.

Iowa has a 15-month Performance-based Training Program for operators. The small group training teaches operators problem solving and leadership skills and helps to establish an operator network. State staff also participate in the training, which: offers a non-regulatory, collegial setting to communicate with operators; helps state staff to learn the mechanics of water treatment and operator challenges; and develops a framework for assisting PWSs. The outcome of Iowa's participation in AWOP allowed the state to identify inconsistencies in their data, and as a result, establish a focus group on data integrity.

Presenter: Danielle Shuryn (New Mexico Environment Department)

Presentation: Revisions to Capacity Development Strategy

New Mexico's 2012 revisions to their Capacity Development Strategy incorporated suitable practices, improved coordination and addressed data management. Capacity assistance objectives included promoting sustainable planning and asset management. New Mexico also revised their Capacity Assessment to align with the compliance, enforcement and funding programs. The revised Assessment incorporates ETT, administrative orders, infrastructure project proposals and review milestones. New Mexico is working to improve its tracking and data management to track capacity over time and support assistance and/or funding provided.

New Mexico established the Sustainable Water Infrastructure Group (SWIG), which combines the assistance provided by the Capacity Development Program with the Source Water Protection and Wellhead Protection programs to incorporate community planning functions into a more comprehensive assistance package for PWSs. SWIG's goal is to assist in the development of sustainable communities through collaborative planning and training.

SWIG partners with the Rural Community Assistance Corporation (RCAC) and New Mexico Rural Water Association to provide assistance. Using third-party TA providers is necessary because PWSs need ebb and flow. SWIG is also seeking new sources of collaboration (e.g., Office of State Engineer, Association of Counties and Municipal League).

New Mexico also revised their Capacity Assessment to align with the compliance, enforcement and funding programs. The revised Assessment incorporates ETT, administrative orders, infrastructure project proposals and review milestones.

New Mexico is working to improve its tracking and data management to track capacity over time and support assistance and/or funding provided.

Questions/Comments

- What are the benefits of Kansas' Web-based survey over Survey Monkey?
 - Survey Monkey cannot interface with SDWIS.
- How does Kansas' Web-based survey connect with SDWIS?
 - The Web survey pulls data from SDWIS. Information is not loaded into SDWIS, but can complement the data in SDWIS.
- Can the state see each PWS' entries in the Web-based survey?
 - Yes, the state can view PWS results as part of the survey's reporting functions.
- Can Kansas' Web-based survey compare data from one year to the next?
 - Yes.
- What has been Kansas' participation rate with the Web-based survey?
 - The electronic survey has not been used yet, but Kansas had a 97 percent response rate with paper surveys, although this took persistence on behalf of the state. After the initial deadline passed, the state sent a reminder with a new deadline, and then a TA provider would follow up, if needed. Kansas intends to use this same approach with the Web-based survey.
- Do Mississippi's regulations require board/council training?
 - Yes, training is required during the first year of service.
- Is Mississippi's sanitary survey team comprised of only engineers? Does this staff also approve PWS plans and specifications?
 - Yes to both questions.
- Did SWIG merge various government agencies or just help them to communicate better?
 - SWIG helps the drinking water program communicate more effectively (e.g., roundtable discussions on drought).

SESSION 6A: DEMONSTRATING SUCCESS WITH TRIENNIAL GOVERNOR'S REPORTS AND ANNUAL REPORTS

Moderator: Bridget O'Grady (ASDWA)

This session addressed how states are able to document success and progress through Annual Capacity Development Reports and Triennial Governor's Reports. This session also included a facilitated discussion on approaches that can be used to illustrate the efficacy of the Capacity Development Program.

Themes: Best practices for Capacity Development Annual and Governor's reports.

Presenter: Nancy Ho (U.S. EPA OGWDW)

Presentation: Using the ETT Tracker to Supplement the Content of the Capacity Development Annual Report

A state's Annual Capacity Development Report must include information on enforcement priority systems (previously called significant noncompliers), or PWSs with 11 or more ETT points. The ETT Score formula is $\sum (S1+S2+S3+\dots)+n$, where S is the severity of the violation (e.g., acute, non-acute), and n is the duration of the violation. The ETT Scores Tracker tool shows current and historical ETT scores for all PWSs, not just priority PWSs. There are also special lists for new PWSs and PWSs that have been a priority at any point in time.

The ETT Scores Tracker can generate graphs for the following scenarios: state-wide historical trends; PWS-specific; state-wide school/childcare trends; and a comparison of a group of PWSs. The ETT Scores Tracker is accessible on EPA's website (see Trends tab). State staff simply need to request access to the website to download the tool (EPA staff have open access).

Presenter: Ghassan Khaled (U.S. EPA Region 3), on behalf of Michelle Cochran (West Virginia Bureau of Public Health)

Presentation: West Virginia's Report to the Governor

When developing the Triennial Capacity Development Report to the Governor, states may want to consider the following:

- Including an executive summary.
- Using a combination of text, graphs, bullets, tables, etc.
- Linking the report contents back to the Capacity Development Strategy.
- Using updated baseline data to track progress.
- Including persuasive narratives.
- Using the report as a chance to market the program.
- Showing data trends, as well as improvements/progress (or lack thereof).
- Not just presenting a table/graph but also explaining what the data means and its significance.
- Showing outcomes.
- Providing examples.
- Being brief and concise.

West Virginia recommends including the following sections in the Report: Executive Summary; What is Capacity Development?; Why was this Governor's Report Developed?; Capacity Development Implementation (including data and graphs); Future Activities; and Resources.

Questions/Comments

- Are there any states that would not use the ETT Scores Tracker for their Annual Capacity Development Report?
 - Wisconsin currently queries their own database and matches ETT scores with specific violations, but would consider using the ETT Scores Tracker in the future.
- What features of the ETT Scores Tracker are most useful?
 - The Tracker shows scores below the priority level of 11 to indicate PWSs that are nearing priority status. The Tracker also shows how many times PWSs have been in and out of priority status.
- Do states think that the ETT is more useful than the significant noncompliers system for handling small systems?
 - The majority of states responded "yes."
- Can data in the ETT Scores Tracker be sorted by county?

- No, but a cross query with PWSID numbers could be used.
- Enforcement staff would benefit from seeing the trends in data, so Capacity Development should share this information. It is important to note that the ETT lags by at least 2 quarters.
 - The ETT does not have real-time data and is based on the data that are uploaded to SDWIS/Fed.
- EPA Region 3 created an ETT Team of Capacity Development, Enforcement and DWSRF staff. The Team meets every quarter to discuss priority PWSs and identify reasons for violations (i.e., technical, managerial or financial issues).
- Since enforcement priority PWSs are reportable by statute, EPA Headquarters may want to consider requiring states to include a sentence or two in their Annual Report that the state reviewed ETT scores.
- West Virginia used the terms “viable,” “marginal” and “failing” to describe PWSs in their Annual Report. How are these three categories defined?
 - Every 3 years, the state uses a point system to assess PWS capacity, which determined the categories of viable, marginal, or failing. For the next report, West Virginia will use terminology from the ETT, with a focus on PWSs with 8 or more points.
- Have states received feedback on the Governor’s Report (e.g., from TA providers, vendors, etc.)?
 - Recently, environmental justice advocates in California have provided feedback.
- Reporting success with declining resources is a double-edged sword. Have states had success in reporting needs in the Governor’s Report?
 - Need to be sure to explain that programs are continuing to improve in order to address more PWSs, while suggesting that more resources would be beneficial.
- What is the difference between a Capacity Development Annual Report and a Report to the Governor?
 - These reports are mandated by two different statutory requirements. The Governor’s Report must be produced every 3 years, and the audience knows very little about drinking water. The Annual Report is a yearly report to EPA to determine if the program is being implemented properly. If no, 20 percent of DWSRF funding could be withheld. The Report to Governor is a summary of the previous three Annual Reports but should be written and presented in a different way.

Facilitator: Bridget O’Grady (ASDWA)

Facilitated Discussion on Governor’s Reports

- How many states think that their Capacity Development Program is strong and are proud of the work they do? How many states say this in their Governor’s Report? How many states receive feedback from the Governor?
 - Most states believe that they have a strong program and are proud of their work; a few states outline this in their Governor’s Report; and no states receive feedback from the Governor.
- Were any states inspired by West Virginia’s presentation?
 - Kansas plans to use more charts/graphs from their online survey and use less text.

- North Carolina would like to add sound bites to promote what they are doing. A companion press release that includes sound bites would further disseminate the message.
 - Another state plans to incorporate more charts/graphs in their report and make the report more readable for non-drinking water staff.
- One state said it feels like they are “talking to themselves” when writing the Governor’s Report, and it is frustrating that the Report is typically not read or used. However, the Report does serve as an opportunity to reflect on the program’s progress.
 - EPA suggested that they could compile success stories from all of the Governor’s Reports.
 - ASDWA suggested that states consider the conditions in their specific states and emphasize the best features of their states, as well as the areas for improvement, in their reports.
- What does EPA regional staff believe that states need to include in their Governor’s Reports that they are not currently including?
 - Region 4 would like to see more focus on how PWSs are doing with respect to TMF capacity.
 - Region 5 would like to see more public outreach efforts to share information in the reports.
 - Region 9 would like to see more information about future efforts. Region 9 typically reads the reports and looks for improvements and outcomes and will send reports back to states for revisions, if warranted.
 - Region 10 would like states to showcase any AWOP efforts.
- What do states think is the most difficult aspect of writing the Governor’s Report?
 - Attempting to address all aspects of the drinking water program is a challenge. Additionally, quantification of results, in order to show causes and effects from the data, is difficult.
 - The reader’s (i.e., Governor’s staff member) level of expertise is unknown. The Governor’s staff is not going to read a lengthy, but comprehensive, report; states are limited to a concise (e.g., 10 page) document.
 - One state advised against delivering a press release at the same time the report is delivered to the Governor because the public may ask the Governor questions about the report; better to stagger the release. One recommendation is to request the press release through the Governor’s office.
- Is there a minimum length to a Governor’s Report? Can it be a brochure or a poster?
 - The statute requires that a report be produced and be made available to the public, but does not specify what form it should take. A multi-page brochure could be acceptable. A poster in addition to the traditional report could be a good marketing tool.

SESSION 9A: ENHANCING MANAGERIAL AND FINANCIAL CAPACITY THROUGH SUSTAINABILITY PRACTICES

Moderator: Sahba Rouhani (U.S. EPA Region 5)

This session included a demonstration of recently developed resources, tools and materials available to states and PWSs that can strengthen managerial and financial capacity. A presentation on board member training and an associated exercise on rate setting were also included in this session.

Themes: Reviewing existing resources and identifying needed resources; decision-maker training and rate setting.

Presenter: Sonia Brubaker (U.S. EPA OGWDW)

Presentation: Resources to Strengthen Managerial and Financial Capacity

The goal of the Capacity Development re-energizing effort is to increase the number of sustainable PWSs. One of the ways EPA supported this goal was to support workgroups to discuss important topics related to small system sustainability.

The Managerial Capacity Workgroup, which met from November 2010 to November 2011, discussed measuring managerial capacity, evaluating asset management program implementation and targeting board member and owner training. The Managerial Capacity Workgroup developed the following products:

- Assessing Water System Managerial Capacity. This document provides a quick background on the Capacity Development Program; includes three common approaches for assessing TMF capacity; and contains popular indicators that identify PWSs' strengths and weaknesses and measure improvement in PWS managerial and financial capacity.
- Capacity Assessment Questionnaires on ASDWA's CapCert Community. This effort resulted in a collection of capacity assessments used by state Workgroup members.

The Asset Management Workgroup met from June 2012 to June 2013 and discussed different strategies to promote asset management; the definition of asset management; DWSRF incentives and requirements; training and TA; and capacity assessments and sanitary surveys. This workgroup generated the following products:

- Reference Guide for Asset Management Tools. This Guide of tools is intended for small and medium-sized water sector systems implementing asset management practices.
- Asset Management State Initiatives Matrix. This matrix of asset management practices, initially developed by the Managerial Capacity Workgroup, was compiled based on a series of surveys to states, as well as input from the Asset Management Workgroup. The matrix may be updated in the future through additional surveys.

The Workforce Workgroup and ASDWA Small Systems Committee produced the following product:

- Small Water System Resource: Hiring or Contracting a Licensed/Certified Water Operator. This document includes information on how a licensed/certified operator can help provide safe water. Contents of the document are decision-maker versus operator responsibilities; an interview tool; potential operator duties; and topics for a written agreement with an operator.

EPA has also developed resources that can help systems attain and enhance TMF capacity. These include:

- Water efficiency and conservation resources: EPA's WaterSense Program; Control and Mitigation of Drinking Water Losses in Distribution Systems (water loss guide); and factsheets for PWSs on water efficiency, water availability and variability, and water audits and water loss control.
- EPA's Check Up Program for Small Systems (CUPSS) is a free asset management tool. EPA also holds quarterly CUPSS Community Calls to facilitate discussions on asset management implementation.
- Energy Use Assessment Tool. This is an Excel-based tool for small water and wastewater utilities to conduct a utility bill analysis using electric bills.

- Rural and Small Systems Guidebook and Workshop-in-a-Box. These tools were developed in collaboration between EPA and USDA and will be discussed in further detail during Session 10.

Presenter: Stacey Isaac-Berahzer (UNC Environmental Finance Center)

Presentation: Training Decision-Makers

The Environmental Finance Center (EFC) Smart Management for Small Water Systems is a project funded under a cooperative agreement with U.S. EPA to identify best practices to reach small systems.

Training decision-makers, including water system boards, is one of the activities that the EFC offers.

These decision-maker trainings may include the following topics:

- Funding – spectrum of fund interactions include fund transfer (least defensible) to return on investment to franchise fee to payment in lieu of taxes to cost allocation (best practice).
- Budgeting – helps assess the level of sophistication of the governing board/staff and can help prioritize other areas for assistance.
- Rate Setting – outcome can vary based on the PWSs' objectives, such as full cost recovery/revenue stability; encouraging conservation; fostering business-friendly practices; or maintaining affordability.

In addition to the training topic, training size and location are important considerations. A group workshop involves multiple PWSs and results in peer-to-peer learning, but participants must travel to the classroom. An individual workshop with one PWS allows for focus on the individual PWS issues; an individual workshop can be more convenient and include less travel. Sometimes convenience is important, or sometimes appeal of a location (e.g., metropolitan area) is important. Previously, the theory was that small municipalities did not want to travel, but this not necessarily the case.

The timing of the training (during or after business hours) is another important consideration. The ideal time typically depends on the PWS (e.g., a PWS at a homeowner's association may need to train in the evening). Other training factors include: providing food/beverages; awarding CEUs; and cost. EFC recommends the following practices: ask local communities about their preferences; start with a group classroom setting and then offering one-on-one as needed; find a third party to donate food (if feasible); and use simple and straight-forward training tools and materials.

The UNC EFC has developed interactive Water and Wastewater Rates Dashboards for a handful of states and Canada that have been effective in assisting PWS managers, local officials, and the state in analyzing rates.. Georgia requires that PWSs use the Dashboard in order to be eligible for a Community Development Block Grant (CDBG). A statewide Dashboard could be developed by the EFC using state DWSRF set-asides. Other EFC tools include rate setting tools and a Water and Sewer Rates Analysis Model, which is an Excel-based tool to determine projected 20-year finances under new and existing rates.

Group Exercise

A group exercise demonstrated how to get communities to move from unhealthy rate setting practices to the more sustainable, logical ways to set rates.

Unhealthy rate setting practices include:

- community perception
- pass-through rates
- pride in keeping rates low/unchanged
- failure to include reserves in rates, so the true cost of capital improvements are not

- captured reliance on “free money” (e.g., DWSRF)
- only raising rates because the state/funding agency forced them to as a condition of the loan (this could be a healthy practice)
- meant for personal gain (e.g., help a neighbor)
- reducing rates when loan is paid off to look good for board (good image for re-election purposes)
- guessing/from thin air

Healthy rate setting practices include:

- asset management (e.g., EPA’s Check Up Program for Small Systems)
- cost analysis
- Level of Service
- public process/buy-in/education
- third-party (i.e., non-utility) vetted rates
- comparison with a successful PWS (e.g., of base charge)
- funding agreement requirements (e.g., rate study and adopting recommendations of the rate study)
- gradual increases
- tie to consumer price index
- involving the PWS in the rate study (conscientious decisions based on the community’s needs)

Methods to help PWSs move from unhealthy to healthy rates setting include:

- help media outlets understand the value of water
- do not require a public hearing if rates increase by a certain percent
- understand the importance of governing structure in PWSs’ ability to set rates

Questions/Comments

- What additional resources for managerial or financial capacity do states need?
 - Effective communication strategies for value of service (including water rates)
 - Discussions from the operator to the PWS decision-maker and the PWS to customers.
- Is the Small Water System Resource: Hiring or Contracting a Licensed/Certified Water Operator document specific to drinking water utilities? Can it be modified so it is applicable to wastewater utilities as well?
 - The document was developed for drinking water utilities, but some content that is applicable to wastewater utilities can be gleaned from the document.
 - ASDWA’S Small Systems Committee plans to develop a generic version of the operator tool to give to TA providers.
- How can states access the managerial or financial capacity resources described?
 - Some documents are currently on EPA’s website, and others are currently under review.
- Is EPA able to provide printed copies of these resources for small communities that do not have Internet access?
 - With the current EPA budget, funds are not available for printing. Also, some tools are directed at states and should not be handed directly to small systems who may find them overwhelming.
- Does EPA have a webpage that describes the content, audience and timing of the CUPSS Community Calls?

- This information is not currently on EPA's website, but this could be added to the CUPSS webpage. Please note that the CUPSS Community Calls are intended for everyone.
- States and EPA should consider how to get these resources into the hands of decision-makers.
- Were some utilities reluctant to participate in the EFC Dashboard because they did not want other utilities to see their rates?
 - Surveys are conducted to obtain the rates for the Dashboard. EFC partners with various agencies in different states to conduct the rates surveys.
- Did EFC develop a Rate Dashboard for all of Canada?
 - Yes, the Dashboard includes utilities from across Canada.
- Would states like to include EFC's tools on ASDWA's CapCert Connection blog?
 - Yes.

SESSION 11A: SMALL SYSTEM FUNDING AND SUSTAINABLE FINANCING

Moderator: Kiri Anderer (U.S. EPA OGWDW)

This session focused on how states are funding weather-related (e.g., drought) resiliency efforts. Additionally, this session included a presentation on sustainable financing approaches for small CWSs.

Themes: PWS resiliency, regional and financial planning, emergency response and water conservation.

Presenter: Kiri Anderer (U.S. EPA OGWDW)

Presentation: Small System Funding and Sustainable Financing

The DWSRF program is concerned with PWS resiliency because of climate change, extreme weather, increasing pressures on water supplies and aging infrastructure. Resiliency projects "reduce flood damage, risk, and vulnerability" or "enhance resiliency to rapid hydrological change or a natural disaster." Examples of resiliency projects include those that promote prevention (relocating infrastructure); protection (physical hardening, wind-resistant features); maintaining infrastructure (larger fuel/chemical storage, backup power, interconnections); or preparation (planning or evaluation). States can promote resiliency by educating PWSs or adding DWSRF priority ranking points for resiliency. States can also incorporate resiliency into water system planning by evaluating vulnerability and mitigation options.

Presenter: Dorothy Young (Texas Commission on Environmental Quality)

Presentation: Drought in Texas: Challenges and Collaboration

The cyclical challenge of handling drought: drought → concern → panic → rain → apathy.

To address drought, PWSs can develop new sources; improve current sources; or manage and plan for drought. The Texas Governor's drought initiative established the Texas Emergency Drinking Water Task Force, which meets weekly to discuss PWSs with less than 180 days of available water. Members include regulatory agencies, emergency response personnel, funding agencies (state, federal and TA providers) and TA providers (including the Council of Governments). Collaboration of all stakeholders is key. Methods include onsite community meetings; onsite assistance for TMF capacity; and workshops (e.g., on rate setting).

Texas also established the Texas Water Infrastructure Coordination Committee 3 years ago to coordinate funding for PWSs by providing one-stop shopping for PWSs seeking funding. Texas has learned that money talks, but it can be a vehicle to talk about other topics, such as water loss, rates, regionalization, customer relations, and planning and emergency response.

Presenter: Jason Bodwell (Georgia Environmental Finance Authority)

Presentation: Water Loss Training & Technical Assistance for Small Water Systems in Georgia

The Georgia Water Stewardship Act of 2010 encouraged water conservation and required PWSs to perform a water loss audit (with different timelines for small and large PWSs). Georgia used the 2 percent DWSRF set-aside to train small systems to conduct a water loss audit. The Georgia Environmental Finance Authority (GEFA) contracted services to provide training to local governments on water loss and water efficiency.

Phase 1 of the project (\$500,000) included training design, marketing and delivery. The training program lasted 8 months and included three workshops and a variety of conference calls. The results of the PWSs' water loss audits were posted online (average loss was 20.1 percent).

Phase 2 of the project (\$124,000 for program management and \$524,000 for TA) included identifying priority areas for improvement for 49 projects. GEFA infrastructure loans were used to implement improvements. TA was provided for large customer metering testing, master meter testing and leak detection.

Presenter: Ted Jackson (Georgia Environmental Protection Division)

Presentation: Regional Planning in Georgia

Georgia has 10 regional water planning districts that are used as the basis for regional water planning in the state. Georgia used a 40-year benchmark horizon to compare existing water capacity to total forecasted demand. Data and resource assessments were used to determine forecasts. The state considered how select practices can adjust supply or demand (e.g., water conservation). Water demand forecasting revealed that municipalities will have the greatest increase in water demands in the next 40 years (assuming an increase in population). Surface water supply analyses revealed that demand will exceed supply at some locations, sometimes significantly. Ground water supply analyses revealed that there will be some shortfalls during periods of dry conditions.

Georgia developed 10 regional water plans based on the results of the analysis. Demand management recommendations included: sector-specific solutions; reuse; local ordinances (e.g., outdoor watering); education; additional data gathering and analyses; and further research. Supply management recommendations included: optimizing existing reservoirs; master planning; identifying new reservoirs and wells; aquifer storage and recovery testing; and inter-basin transfers (possible political contentious).

Next steps include holding at least two meetings per council in 2013-2014; conducting regional assessments of implementation status; identifying regional water plan seed grants; developing guidance; engaging in the 2016 plan updates; performing a 5-year review and revision; continuing and enhancing technical work; and permitting water use based on the regional water plans. To fund this project, a variety of funding sources were used, including the DWSRF, direct state investments and GEFA loans.

Presenter: Bob Schneider (Michigan Department of Environmental Quality)

Presentation: Sustainable Financing and Financial Action Plans

Michigan implemented a voluntary Financial Assessment Program to conduct rate studies for PWSs serving 10,000 or fewer customers. Participating PWSs are identified for the Program through district staff recommendations, word of mouth and publications (e.g., newsletter). The process includes reviewing financial and legal documents; conducting an onsite visit to discuss findings; and preparing a Financial Action Plan (approximately 20 pages with goals and steps, which can serve as a basis for a DWSRF loan). Overall, the process takes 1-3 months.

Michigan also incorporates asset management principles (using EPA's Check Up Program for Small Systems); conducts follow-ups as needed (typically after 6-9 months); offers managerial CEUs for participation; and provides compliance assistance, if necessary. Michigan developed the Stormwater, Asset Management, and Wastewater (SAW) Program that provides grants to fund asset management plans. Michigan's regulations require PWSs to have a capital improvement plan that identifies system needs in the 5- and 20-year planning periods. Michigan developed a simplified Asset Management Plan, which is an Excel-based tool that includes worksheets for asset inventory/criticality, Level of Service, rate methodology and capital improvement planning.

Overall, the Program has assisted 80-90 PWSs in 10 years. Some PWSs choose not to participate because they view the process as regulatory or interference, or they are not able to commit the required time.

Questions/Comments

- The Water Research Foundation conducted a study on Climate Change Communications, and the Rural Community Assistance Partnership (RCAP) provided perspective on small systems for the study. The study should be released in early 2014.
- It would be great to have programs like GEFA's training program that have been pre-planned, but not implemented, until the "panic" mode of drought sets in.
 - Many of Texas' PWSs had drought contingency plans, but the correct triggers were not used in the plans. States are not able to reach every PWS when panic hits, so it is necessary to have a combination of proactive and reactive measures to implement.
- How was GEFA able to achieve a 95 percent participation rate with an 8-month training program?
 - 108 of 120 PWSs initially signed up, but a few dropped out. But most stayed on for the full 8-months. Motivators were the enthusiasm of participants, GEFA, and trainers, as well as the participants' understanding that money could be saved by reducing water loss.
- Do any of the states presenting use the Water and Wastewater Agency Response Network (WARN) or Rural Water Associations?
 - Texas uses both Texas WARN and the Texas Rural Water Association. The Texas Council on Environmental Quality and CRG Texas have also been valuable partners.
- In Rhode Island, Tetra Tech is conducting a climate change study with three different horizons and different climate events (e.g., drought, flood) that is specific to each PWS. The study results were presented to each PWS, which showed parts of infrastructure would be under water and what the associated cost would be; this worked like a scare tactic for many PWSs. The next phase of the project is to develop communications plans so that PWSs can go to their boards to ask for funding to make infrastructure improvements.

- Are any of the materials for Michigan's Financial Assessment Program available online?
 - Yes, the materials are available on Michigan's website at http://www.michigan.gov/deq/0,4561,7-135-3307_3515_3517-10784--,00.html
- Do other states have a financial assessment program similar to Michigan, but employ a third-party provider?
 - A few states had similar programs delivered by a TA provider. Sometimes using a non-regulatory entity can improve participation.
- In terms of reviewing documentation for the Financial Assessment Program, how much confidence does the review team have in the financial data evaluated?
 - Michigan requires PWSs' financials to be reviewed on either an annual or bi-annual basis, so there was generally high confidence in the documentation reviewed.

OPERATOR CERTIFICATION SESSIONS

SESSION 4B: OPERATOR CERTIFICATION PROGRAM IMPLEMENTATION: HOT TOPICS

Moderator: Bridget O'Grady (ASDWA)

This session focused on operator certification hot topics including: certified operator databases; computer-based/electronic testing; approval of CEU; and interstate emergency response.

Theme: Tools and resources for successful operator certification program implementation.

Presenter: Bill Sullivan (Connecticut Department of Health)

Presentation: CT e-License Online Data System

The State of Connecticut developed an electronic license (e-license) online data system to: Streamline the application review process; assist document creation, data management and file system (e.g., approval/denial, renewal notices, fee processing); Enable live online updates of information; Host online rosters that can be queried; More easily respond to Freedom of Information Act requests. Certified operator information is available publically online.

In the future, Connecticut hopes to make all of its processes paperless, including: operator information updates; renewals; email updates; and approved training courses.

Presenter: Deborah Soles (North Carolina Water Treatment Facility Operators Certification Board)

Presentation: Computer/Electronic Testing

Traditionally conducted paper exams, which were very time consuming and infrequent. A few things to consider when developing e-Testing are:

- Work with operator certification board to reach an agreement regarding the approach.
- Consider security (monitor activity to ensure legitimacy and scramble questions), logistics (availability of computers and Internet, and staff needed), equipment and cost.
- Advantages include: no paper (reduce time and money spent); instant results; no fee increase; and use of pre-existing lab site or laptops purchased by the state.

In North Carolina, the questions are modified quarterly. The board reviews these questions, if they are not ABC questions. In the future, North Carolina will move to completely electronic exams, including exam on-demand program. North Carolina also hopes to have the ability to upload exam results directly to a database to reduce human error and increase efficiency.

Presenter: Peggy Barton (Washington Certification Services)

Presentation: Evaluating and Tracking Operator Training: Lessons Learned

In Washington State, Washington Certification Services administers certain parts of the certification program, and Green River Community College administers the growth portion of the program. Washington Certification Services is a database driven program and monitors certification on an on-going basis. Washington's professional growth requirement is needed to achieve certification/licensure. Professional growth is tracked on an on-going basis and not at the end of a renewal cycle. Washington allows operators to advance by examination in lieu of training.

Washington evaluates every individual training course to ensure it meets Washington's Department of Health criteria, including: responsible sponsorship; relevancy; and minimum course length (at least 3 hours). Trainings must be accredited to receive CEUs. Approved courses are posted on the Web.

In an effort to ensure the relevancy of training courses, Washington does not use a list of training topics or ABC's Need to Know for exams, which allows the operator to consider emerging topics, such as security and new regulations, and to choose trainings that more closely align with their PWS' efforts.

After the completion of a training course, CEU assignments are posted to the database and are valid for 3 years with no changes.

Washington's database includes: operator information (dating from 1998); operator roster for each course; and the ability to export profession growth transcript.

Key lessons learned:

- Focus on what is important and keep it simple.
- Capitalize on the use of a Web page and update the page frequently to ensure everyone has the necessary information.
- Streamline forms, guidance and instructions. Limit exceptions whenever possible.
- Educate, inform and communicate.

Presenter: Joe duRocher (New Jersey Department of Environmental Protection)

Presentation: Emergency Response

New Jersey, like New York, participates in Water and Wastewater Agency Response Network (WARN). NJWARN is a voluntary mutual aid agreement that PWSs may sign in order to facilitate the exchange of staff, resources and equipment after an emergency event. PWSs must sign a mutual aid agreement to join WARN. Even though it is free and voluntary, it is difficult to get PWSs to join.

- **Before an emergency event:** PWS must determine personnel roles (emergency response coordinators, essential personnel); and update/verify contact information (internal/external). Contact list should be direct numbers, which is different than the typical list used. This list should be kept confidential. The ability to communicate is essential during an emergency event.
- **During/after an emergency event:** Respond to water and wastewater emergencies.
- **Immediately after an emergency event:** Identify impacted PWSs; conduct a post-impact situational briefing; and provide TA.

Following Hurricane Sandy, New Jersey received 3,000 resource requests over 3 days (mostly for generators and fuel). These requests required the state to prioritize PWSs and to communicate with other agencies.

New Jersey initially anticipated 24 hours would be needed to process resource requests and get PWSs back up and running, however New Jersey determined 72 hour is a more realistic timeframe. This timeframe will be built into resiliency measures going forward. New Jersey plans to set-up a database to more efficiently respond to resource requests. New Jersey is focusing on asset management to prepare for future events.

Presenter: Teresa Boepple (New York State Department of Health)

Presentation: Emergency Response

New York also participants in WARN, a voluntary mutual aid agreement between water utilities in the state. In New York, 120 PWSs are involved in WARN (including New York City). Before the emergency

event, New York does the following: tracks water supplies; prepares boil water notices; and procures certified bottled water. An emergency stockpile of equipment can help to provide needed resources to PWSs. During the emergency event, Operator Certification Program staff may be called-on to support the emergency response effort. In addition, the Drinking Water Program may volunteer to conduct damage assessments to assist the emergency management office.

As emergency events are getting bigger, New York will look at interstate cooperation and mutual aid agreements to determine how they may get help from other states during future emergency events.

During Hurricane Sandy, New York (through executive order) performed an overnight approval of bottled water distributors. After the emergency event, New York staffed a post-disaster center for homeowners need support with clean up and private wells.

Lessons learned from Hurricane Sandy include: pre-defined potable water locations; ensure boil water orders and other public notification language is pre-developed; and ensure staff have access to critical data remotely.

Questions/Comments

- When creating questions on quarterly basis, does North Carolina just scramble the questions? What is the question qualification?
 - All questions are National Commission for Certifying Agencies (NCCA) certified. The questions change quarterly (not just scrambled). North Carolina looks at who passes or not and determines why people are not passing. Questions are added consistently. Questions are developed based on regulations and ABC's Need to Know criteria.
- What is North Carolina's record retention of electronic exams? Once data is electronically entered, it does not go away; how has North Carolina dealt with that?
 - North Carolina keeps one copy of every exam ever given, as required by the Operator Certification Board. All paper exams were scanned and kept electronically.
- States express that they are not able to release operator information as part of state Freedom of Information requirements (e.g., phone numbers, addresses, etc.). Has Connecticut had this issue?
 - Because Connecticut was dealing with so many requests for information, it drove the decision to post the information on the Web. Based on the state law, all information is publically available. Currently, Connecticut does not provide birth place, social security numbers, etc. Connecticut has been in contact with attorneys to ensure information is appropriately posted.
- Does Connecticut send out paper certificates to operators?
 - Currently Connecticut mails out certificates. In the future operators will receive the certificate in an email that they can then print.
- Does Connecticut's e-license system have bar code capabilities?
 - Connecticut has not seen bar code data entry that would dump data into a data system.
- Does Connecticut's e-license system have electronic roster retrieval for continuing education programs?
 - Currently, the data system only enables electronic roster submittal. In the future, the system will allow for a data dump of the program's roster.
- In Washington, can operators receive CEUs for non-pre-approved training?

- Operators can attend a non-pre-approved training, but the operator must submit a form to the state to get approval. The training must meet all of the state's criteria. Training sponsors can pre-approve a training. Sponsors must submit documentation as part of the approval process.
- In Washington State, is college credit the same as CEU?
 - In Washington, either is accepted; the two are considered equivalent. 45 CEU equals one year of college credit.
- How do you ensure operator takes diverse courses on a variety of training topics?
 - In Washington they do not have a requirement for the different training topics required. Operators just need to meet relevancy criteria. Washington still has limitations to this process, as training is not based on the classification of certification. Small PWSs have to meet the same training requirements as large PWSs. Washington does not track emergency training.
- Participants are encouraged to go home and look at their state program. A major emergency event has implications for water supplies and will effect PWSs overall. Protocols should be in place to ensure states and PWSs are prepared for an event. WARN is a good resource and should be considered by states and PWSs.
 - New Jersey requires any PWS serving more than 3,000 people to submit an emergency response plan.
- Has New Jersey reflected on what PWSs were or were not able to tell the state about their situation during command center communications? Do PWSs require different training?
 - New Jersey has done some training, including emergency preparedness training, to make sure all PWSs are aquatinted with the appropriate protocol to follow.
- In New York, do mobile treatment units need to meet state requirements? Alaska has had issues in the past where units purchased by a private party did not meet state drinking water requirements.
 - New York faced a similar situation in which the emergency management office purchased equipment that did not meet state requirements. Now New York requires all equipment to meet the state's criteria.
- During Hurricane Sandy, empty bottled water containers were used to hold gas. These bottles were then returned and went back into production. Customers purchasing bottled water complained about the taste and odor of gas in their bottled water. New York is working with the International Bottled Water Association to address this issue.
- How are states reviewing Web-based training and determining if it can be an approved training? Does any state have an approved protocol for reviewing these trainings?
 - In Colorado trainings (both Web and in-person) are all reviewed using the same process. Trainings are approval by subject matter experts.
 - In Florida, webinar approval is a concern. In Florida, approved Webinars had to have security to determine if someone is watching the Webinar (and it is not in the background on the computer screen). Approved Webinars also require interaction during the Webinar. Many Webinars do not meet the approved security criteria. Live Webinars are more often approved versus Webinars viewed at a later date, due to the increased security capabilities of live Webinars. The use of proctors during Webinars can

attest who is attending a Webinar. Technology (e.g., WebEx) can help to ensure who is attending the course, and if the Webinar was at the front of the attendees screen.

SESSION 6B: HOW EXTERNAL PROGRAM REVIEWS CAN WORK FOR YOU

Moderator: Janine Morris (U.S. EPA Region 4)

This session discussed external program reviews, which are a requirement of the state Operator Certification Program. Many states have a lot of questions surrounding the external review, including: how to conduct a review and what EPA wants to see as the result of a review. The session reviewed a traditional approach in Georgia, and an interstate approach in Iowa that followed ABC guidelines.

Theme: Two unique approaches to conducting an external review.

Presenter: Ron McMillan (Georgia Environmental Protection Division [EPD])

Presentation: Georgia's External Review Process

Georgia administers an EPA-approved Operator Certification Program. As part of this program, Georgia prepares annual reports to ensure compliance with requirements. Georgia's State Board of Examiners manages the certification of water and wastewater treatment plant operators. PWS classifications determine the skills and experience an operator in charge must have. Georgia has 9,000 licensed operators (including water, waste water, and laboratory certifications). PWS classifications are from Class 1 to 4, with Class 1 requiring the most experience.

Georgia Association of Water Professionals (GAWP) was contracted to administer Georgia's Operator Certification Program's formal external review. To develop this review, they developed an online survey and a comprehensive report, providing results and recommendations. To conduct the survey, GAWP used a database of all licensed operators.

Sample question pools created were developed by a focus group (including: GAWP District Directors; Committee Chairs; GA EPD staff; key association members; instructors; and others). GA EPD staff and focus group members approved the final question pool. Questions in the final survey pertained to: communications with water and wastewater board; certification/licensure exams; other certifications; continuing education training; and reimbursements. The survey had a total of 14 questions. The survey was online and used Survey Monkey. The survey was released for open participation. Both electronic and paper-based solicitation was used to get survey respondents. 615 license-holders participated.

GAWP analyzed survey results and produced a final report summarizing the results and providing recommendations. Recommendations included:

- One dedicated staff member should be available to answer questions on board rules, laws and procedures.
- Board meetings should be more transparent and meetings should be held in more than one location.
- GA EPD should consider amending its rules to clarify on-site/on-duty requirements for certified PWS operators at surface water treatment plants.

Presenter: Megan Baker (ABC) on behalf of Laurie Sharp (Iowa Department of Natural Resources)

Presentation: Interstate Program Reviews

Megan explains Iowa's external review process. Laurie was hesitant going into the process. She knew that ABC's Model Standards set a high benchmark and was aware that Iowa's Operator Certification Program may fall short somewhere.

The external review team included Mike Wentink from Nebraska's Operator Certification Program who is familiar with the National Operator Certification Program history and a third-party industry representative from ABC.

The review included a pre-review phase, which required Laurie to gather program documentation that was then reviewed by the external review team. There was also an on-site phase (lasted a day and a half), where the external review team interviewed staff members and reviewed databases.

The review team produced an assessment document that included: an introduction (who was involved, what was reviewed, time period, etc.); general summary of findings; the standards (i.e., benchmarks); assessment finding; conformity with the standard (yes or no); and recommendations. Recommendations provided to Iowa included: rule clean up (ensuring transparency with stakeholders); standard operating procedures (SOPs) development and updates; eligibility requirements; code of conduct; and professional growth requirements. The assessment provided Iowa with the steps they need to take to bring their program into compliance with ABC's Model Standards. The assessment findings also helped to energize the team. The document serves as an industry-driven model standards document that helps to document program needs and can be used for strategic planning.

Third-party reviewers are an important attribute of the external review, as Mike Wentink and ABC had no stake in the process. Iowa plans to use ABC's Model Standards in the internal review process. Iowa also plans to do external reviews in the future.

Presenter: Mike Wentink (Nebraska Department of Health and Human Services)

Presentation: Interstate Program Reviews

Mike Wentink discussed the reviewer's perspective of the external review. EPA's Final Guidelines for Baseline Standard 9 requires internal and external reviews. EPA's Guidance Memo in 2009 is a well-written document by EPA to serve as guidance for reviews. Many state Operator Certification Programs undergo internal reviews throughout the year. However, external reviews have yielded a number of questions. The approach for Iowa was to review the state's Operator Certification Program against ABC Model Standards to determine how the state can increase efficiency and better utilize resources available.

Materials, including regulations and statutes, were reviewed prior to the on-site review. The on-site review helped to determine the activities taking place at the state. A third-party reviewer ensures that the evaluation is objective. The reviewer also is very familiar with operator certification program management, as he has been in Nebraska's program since EPA's Baseline Standards were first adapted.

Overall, Iowa's Operator Certification Program staff knows how programs are run and are often aware of shortcomings and desired changes. However, policy and procedures need to be modified. Most shortcomings are regulatory clean up issues. The Program has made changes in how they did things over the years, but they just needed to include these changes in a regulatory format. The process of reviewing materials prior to the on-site visit was very helpful and helped to inform the review. Elements in the Program are closely aligned. Any minor changes to any Program elements would result in changes to others elements. This is a fact that Iowa will need to address when making changes to their program.

The report serves as a good tool for the state. Conclusions are based on industry model standards. External review findings provide documented list of the suggested improvements to processes and procedures.

Questions/Comments

- Are ABC's Model Standards on the website?
 - ABC's Model Standards will be released in January, but a draft can be made available. Laurie will post Iowa's report on their website December 1st. A draft of the report is available on ABC's website.
- How long did it take?
 - The on-site review took approximately 11 hours, and preliminary work (review of material and discussion) took 6 to 8 hours. Mike's portion of the assessment report took 4 to 5 hours. ABC took 2 weeks to develop the report. Overall, the entire process took approximately 1 month. In the future that timeframe may be much shorter, as the format of the report will be standardized.
- Were there questions on Georgia's online survey that verified that the operator was a certified operator? Did you know who was responding to the survey?
 - When the respondent logged into the online survey, they were asked general questions about their operator classification. The identity of the respondent was unknown.
- What was the cost of the external reviews in Georgia and Iowa?
 - In Georgia, the survey was part of a service delivery contract with circuit provider. No additional cost was incurred.
 - In Iowa the review cost approximately \$2,500 to \$3,000.
- Can ABC elaborate on the code of conduct they suggested to Iowa in the assessment report?
 - A sample of the code of conduct was included in the report. The code ensures that candidate operators ensure they will behave in a professional manner. This code of conduct would be presented at the time of initial certification and renewal.
- Will there be follow-up with Iowa regarding their deficiencies?
 - The external review can help to improve an Operator Certification Program but should not include areas where the state is not meeting federal guidelines. If a state is not meeting federal guidelines, 20 percent of the state's DWSRF funding can be withheld. There is no ramification for not meeting ABC's Model Standards.
- What percentage of the survey pool responded to Georgia's online survey?
 - There was a 10 percent response rate.
- Who has the last and final word of the stakeholders in Georgia?
 - EPD had final say in survey questions.
- If the cost of the external review was around \$3,000, what was the breakdown? If you have more operators, would the cost be more?
 - Mike Wentink's work was at little to no cost. He was able to take a lot of lessons learned back to Nebraska.
- In regard to Georgia's survey, does Georgia know why 13.91 percent said they had an unsatisfactory experience with the Water and Wastewater Certification Board?
 - Respondents' biggest issue was the lack of response from the Board.

- The survey identified maintenance as a potential certification need; is Georgia following up on this?
 - Georgia's Water and Wastewater Certification Board is looking into way to include this certification but has made no definitive decisions yet.
- Does Georgia plan to follow-up about the specific training needs?
 - Yes.
- Two different approaches were discussed: an external survey conducted by a stakeholder; and an external review conducted by a member of another Operator Certification Program. What would prompt states to use one format or the other?
 - It is based on whatever is best for that state. Cost could be a factor in this decision.
 - ABC suggests both approaches are used, as stakeholders should be involved in the process of setting program standards.
 - It is important to have an external third-party reviewer who knows the components of an Operator Certification Program but has no stake in program.
 - There is the possibility that states can make agreements to review each other's programs, thereby reducing costs to the state.

SESSION 9B: INNOVATIVE TRAINING STRATEGIES

Moderator: Bob Dunlevy (U.S. EPA Region 7)

This session discussed innovate ways to train operators. Topics include: a New York State study that informed a state's training approach; a participant-centered approach to training; identifying performance limiting factors and customizing the training to address these factors; and online training. The session includes table discussions about the topics discussed.

Theme: Unique and effective approaches to training operators.

Presenter: Teresa Boepple (New York State Department of Health)

Presentation: Adult Learning Styles

New York partnered with a psychology intern from a local school of public health who investigated how best operators learn. ERG funds were used to perform the survey. New York was approaching operators in a way they did not want to learn. The study helped New York to improve the training environment. Improvements to the training approach led to more engagement from operators, who were coming in ready to learn; there was a wait-list for trainings. There was a change in the way operators approached training. Informal surveys were conducted following training programs, which informed the training needs of operators.

Adult Learners:

- Have different learning styles.
- Like an informal atmosphere, informal situations, and interaction.
- See themselves as self-directed and responsible and want respect.
- Learn with practical application.
- Bring experiences to the table and want an opportunity to share experiences.
- Would like to relate learning to what they already know.
- Have expectations of the instructors, including: animation and entertainment from the trainer.

Training Tips for Operators:

- Optimize participants' learning potential. Operators that come into the training arms crossed are not open to learning. Trainers must work to open operators up to learning by reducing anxiety and creating a positive, non-threatening atmosphere.

Basic learning styles vary among operators. The survey found it successful to vary types of learning styles in presentations.

- Keep the operator's interest, allowing them to make decisions on their own. These decisions include: timing of breaks; selection of activities; etc. These decisions get operators invested in the training.
- Use multiple instructors who have different ways of training.
- Special considerations for training an aging workforce. These operators may have limited formal education. Considerations include:
 - Do not teach in acronyms.
 - A classroom can be intimidating, therefore set up the space differently.
 - Modify training to ensure it is conducive for the hearing and visual impaired.
- Free spaces may not be conducive for learning. Trainings are more effective when available funds are used to go to conference centers. A comfortable setting positively affects learning.
- Food helps to open operators up.
- Effective and informative icebreakers can be beneficial for trainers and operators. The icebreaker can help the trainer learn the knowledge base and sentiments of the operators in the room.
- Create active learning environment by:
 - Utilizing small groups.
 - Having supplies available so the operators do not need anything.
 - Providing nametags to facilitate communication and build rapport.
 - Encouraging and facilitating participation. A participation poker game helped to encourage participation: any time an operator participated, they got a card from the deck. The best poker hand at the end of the day got a prize.
 - Encouraging movement. If able, bring in pieces of PWS equipment and have operators move around the room to identify the infrastructure.
- Change-up training methods/approaches throughout the training.
- Establish relevancy by relating the topic back to them and how it will help them. Explain the consequences of not using the materials/concepts (e.g., regulation).
- Give participants the opportunity to evaluate the training.

Presenter: Joy Barrett (Rural Community Assistance Partnership)

Presentation: Participatory Training

Make trainings fun and effective. Focus primarily on face-to-face training versus Web-based training. Web-based design has constraints including assessing the effectiveness of the training, even though there are costs and time constraints associated with in-person trainings.

Feeding people is a great way to get people engaged and fed. Training organizers may need to be creative to do this, as EPA-funded trainings do not allow funding to go towards food. Associations, contractors and vendors may help to support trainings, which could include the cost of food. Vendors may be willing to provide food for a training if they can present or provide promotion material to be handed-out. Ensure that the vendor is appropriate and applicable.

To ensure registrants show up, charge a small fee. Because the registrants have a financial commitment, they are more likely to show up. The fee can be used to purchase food for the training.

The more participation in a training, the greater retention, motivation and engagement. Maximize retention of the training material. The goal is to achieve behavior change (e.g., more accurate analysis, reports, etc.)

Consider the following tips:

- Utilize Icebreaker Activities to build confidence going into the training. Useful icebreakers include:
 - Lining participants up by years of experience to create a human Gantt chart to show breadth of wisdom in the room and to display that participants can be resources.
 - Ask participants to say what they want to get out of the training. Make sure learning objectives are measurable and clearly defined.
 - Semi-rounds more effective to organize the training room. This format encourages collaboration and allows for easy re-organization.
 - Separate friends and colleagues to give participants new perspectives.
- Separate need-to-know and nice-to-know.
- Give people materials to walk away with.
- Transfer strategies by demonstrating concepts (via activities or exercises) that the participant will walk away with.
- Revisiting concepts in creative ways makes concepts easier to retain.
 - An effective review activity is the Jeopardy game developed by EPA, which can be modified to fit the needs of the training.
- Bring different stakeholders together. For example, have an operator training in the morning and a decision-maker training in the afternoon and allow both parties to come together and communicate during lunch.
- Metrics: pre/post testing and follow-up surveys.
- Effective training format/timing: 90 minutes (physical break); 20 minutes (mental break); and 8 minutes (activity).
- Web-based Training: Asynchronous trainings can be assessed at participant's convenience. Synchronous trainings include polls and modest interaction.
- Encourage behavior change.
 - After a distribution system training in Colorado, participants were asked what they would do differently at their system. Received a verbal commitment from participants and the conversation served as an interesting way to find what participants learned from training. Reward for attending was a new Hach meter. Participants were able to bring a new Hach meter to their utility and from the training they had familiarity with the instrument.

Presenter: Alison Dugan (U.S. EPA)

Presentation: AWOP and Performance-based Training

AWOP is a water quality-based program working with existing infrastructure and operation staff. The focus of the program is to improve water quality in larger target areas. AWOP's performance goals ensure better public health protection and acts as an insurance policy for PWSs to ensure they meet compliance. States establish optimization goals. States water quality data helps to assess and prioritize PWSs relative to risk. AWOP helps to document impacts and successes based on state water quality data. Targeting performance improvement (TPI) targets PWS training needs.

Common TPI resources/tools include evaluation and training/follow-up. Documentation of performance helps to ensure effectiveness of the tool/activity and permits changes if needed.

AWOP states award CEUs for AWOP training. PWS evaluations (e.g., CPEs) help to identify performance-limiting factors (PLFs) that may limit the system's ability to achieve optimization or compliance.

Common PLFs:

- Administrative: lack of planning; staff support; complacency; and policies.
- Operations: representative sampling and monitoring; and application of concepts.
- Design.
- Maintenance.

Challenges:

- Quantifying and addressing knowing-doing gap (i.e., application of concepts).
- Defining process control.
- The required skill set of an operator needs to be defined (technical versus leadership/management skills).
- Applying and overcoming obstacles to optimization.

Performance Based Training typically includes 4 to 8 PWSs and one facilitator for each PWS. The PWSs involved are small and the network of PWSs creates positive peer pressure. Trainings are site-specific and include both classroom and plant/field training. Phone discussions are facilitated between sessions. Trainings address common PLFs (including technical and leadership/management skills). All trainings are built on previous content and facilitators are available to help participants through the training. Training sessions are broken-up by topic. Participants are held accountable for long-term tracking of performance. Homework helps to make the concepts real and to solidify skills. Participants must report on their homework to ensure accountability.

Pennsylvania's Operator Certification Program utilized AWOP's Performance Based Training prioritization and training approaches to offer licensing exams and exam training in areas of the state without certified operators

Presenter: Steve Wilson (Illinois State Water Survey at University of Illinois)

Presentation: Effective Online Training

Rural Community Assistance Partnership obtained an EPA grant to work with the Illinois Water Resources Center at the University of Illinois to develop www.PrivateWellClass.org. This website makes it easy for users to find information they need, and it gives wells owners new direct and targeted information on why their well is important and how to protect their well from threats.

The website puts information in a usable form, targeted to what operators need to know. The site contains 10 lessons, using 50 to 60 sources (cited on the website). Every lesson is on a different topic and uses a variety of resources. The trainings take into consideration what is happening in states to make the information relevant. Lessons give reasoning and do not just provide the facts. Lessons deliver a consistent clear message. Lessons were developed with user's diverse economic and educational backgrounds in mind. Overall, many private well owners do not understand the effects of emergency situations on private well ownership. This topic is discussed during a lesson.

Some states have expressed fear that the Illinois State Water Survey (Survey) will not direct inquiries back to the state, however this is false. The goal of the Survey is to get people to the right information and contacts. PrivateWellClass.org does traditional and online marketing plan to reach out to stakeholders. Twitter and Facebook also help to reach stakeholders.

Approximately 2,500 individuals have used the online trainings, which exceeds the grant requirement of 1,000 users; there is still room for growth to reach more private well owners. The training includes a survey at the end and provides users with an email address where users can ask questions. Currently the lessons are not eligible for CEUs.

Questions/Comments

- Is New York's survey, and its results, available online?
 - New York will post the survey on the CapCert Community.
- How long does it take to go through 10 online lessons?
 - Each lesson takes approximately 1 hour.

Table Discussions

What you would do differently to improve operator training. A selection of tables provided the following responses:

- Table 1.
 - Change-out training.
 - Involve participants in training goals and breaks.
 - Read-through learning expectations and realize participants have expectations for training.
 - Be aware of different learning needs.
 - Now ERG funding is over, training organizers may more easily be able to collect fees from registrants to put them towards coffee, etc.
- Table 2.
 - Less words and more participation during trainings to keep participants awake.
 - Semi-circle tables are important.
 - Use of food, and the possibility of bringing in vendors to help pay for food. Vendors should not give a sales pitch.
 - Trainings can help to instill pride in the job and in the operators. Avoiding trashing any organization.
 - Less Webinars and more face-to-face trainings.
- Table 3.
 - Games suggested by presenters sounds effective, in particular the poker game and Jeopardy games. Keeps audience involved and focused.
 - Vary teaching methods.
 - Changing out speakers during the training.
 - More interaction and cut technical jargon.

SESSION 11B: VALIDATING EXAMS: COMPARING STATE APPROACHES

Moderator: Wanda Johnson (U.S. EPA Region 3)

This session discussed state approaches to validating operator certification exams. After the state perspective, ABC provided an overview of the industry standards for personnel certification.

Themes: Exam validation and industry standards.

Presenter: Andrew Barienbrock (Ohio Environmental Protection Agency)

Presentation: Ohio Exam Validation

When developing exams, Ohio first conducts a job analysis to determine the tasks of an operator. Job analyses are updated every few years. This is an effective tool to give to decision-makers so that they can see the important responsibilities operators hold. Job analyses are also good for operators to see, as it includes every task they do. Ohio used ERG funds to train staff to do job analyses. A job task analysis (determined via a survey) determines which job tasks operators feel are most important and the amount of time spent doing the tasks.

To develop questions, Ohio holds question-writing workshops. An eight-person Advisory Council (Council) attends writing workshops. Council members include: professional engineers; representatives from wastewater and district offices; and water and wastewater operators. The Council members take into consideration the analyses performed when developing questions. Ohio developed a guideline to help the Council develop questions. The Council must consider reasonable distractors.

A Need to Know outline is used to help the operators determine what to study. All questions include references to the applicable standards and regulations. References are provided to test takers. A statistical analysis is performed to review the passing percentage of each question. Ohio looks at questions with passing percentages of less than 40 percent. Point biserial coefficient relates answers on an individual question to the total test score and can show how well an item is discriminating. A very low or negative value can signify a flawed question. The Council reviews questions with low passing percentages and point biserial coefficients.

Ohio has not gotten rid of any questions in the past 5 years. Going forward, Ohio's management wants to give exams by computer more than twice a year. Currently, Ohio gives paper-based exams twice a year at the county fairgrounds. Ohio is in the process of approving exam providers that would provide frequent (every 30 days) ABC computer-based tests (CBT), who operators would pay directly. This process requires changing of Ohio EPA statutes. Ohio only validates exam questions; Ohio State validates the exams. The exam validation process would cost Ohio \$100 per exam if they did not have a relationship with Ohio State.

Presenter: Ronald McCulley (Florida Department of Environmental Protection)

Presentation: Florida Licensure Examinations

Exam validation boils down to defendability. If a state does not have a good validation or exam process, then exams mean nothing and your program will have poor credibility. Comparing exams can help to ensure everyone gets a fair shot. Florida uses a blended ABC and state program exam. Florida reviews and validates questions from ABC. Drinking water and wastewater exams are 80/20 state to ABC questions. Distribution exams are 100 percent ABC questions.

A panel of 20 industry experts identifies the tasks that operators do at each level of licensure. Once the list of tasks is developed, Florida surveys operators determine the value and frequency of tasks. CEUs are provided for filling-out the survey, which ensures a high response rate. Source documentation helps to ensure the exam's defendability. Florida investigates negative point biserial coefficients to determine why candidates are getting distracted. Florida looks at content area performance to link the exams to training. This helps to identify training gaps.

Florida has Advisory Committees for drinking water, wastewater and distribution exams. These committees include a number of industry representatives. The committee members are pro bono (state pays for travel) and meet one time per year.